Programmatic ESA and EFH Consultation
for
15 Categories of Activities
Requiring Department of the Army Permits

Biological Opinion

Portland District, U.S. Army Corps of Engineers, has completed a programmatic consultation with National Marine Fisheries Service (NMFS) for 15 categories of activities requiring Department of the Army permits. This consultation, which covers waters of the United States within the state of Oregon, complies with the provisions of Section 7 of the Endangered Species Act (ESA) and the Essential Fish Habitat (EFH) requirements of the Magnuson Stevens Act of 1996.

The Biological Opinion includes mandatory terms and conditions which must be met before a proposed action can be covered by the programmatic consultation. To read the terms and conditions applicable to each category of activity, click on the category in the following list:

1. erosion control
2. water control
3. utility lines
4. road construction, repairs and improvements
5. site preparation for construction of buildings and related features
6. stream and wetland restoration and enhancement
7. boat ramps
8. other minor discharges and excavations
9. installation and repair of navigational aids
10. maintenance of existing structures and marinas
11. installation of small temporary floats
12. structures in fleeting and anchorage areas
13. maintenance dredging
14. return water from upland contained disposal areas
15. fish and wildlife harvest, attraction devices and activities

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
OSB2001-0016

March 21, 2001

Mr. Lawrence Evans
U.S. Army Corps of Engineers, Portland District
ATTN: Mr. Dave Kurkoski
P.O. Box 2946
Portland, Oregon 97208-2946

Re: Biological Opinion on Corps of Engineers' Programmatic Consultation for Permit Issuance for 15 Categories of Activities in Oregon

Dear Mr. Evans:

Enclosed is the National Marine Fisheries Service's (NMFS) biological opinion (Opinion) concluding formal Endangered Species Act consultation on issuance of permits for 15 categories of activities in Oregon as described in the U.S. Army Corps of Engineer's biological assessment (BA) dated March 16, 2000. This Opinion addresses Snake River sockeye salmon (*Oncorhynchus nerka*), Snake River spring/summer chinook salmon (*O. tshawytscha*), Snake River fall chinook salmon (*O. tshawytscha*), Lower Columbia River steelhead (*O. mykiss*), Upper Columbia River steelhead (*O. mykiss*), Snake River steelhead (*O. mykiss*), Upper Willamette River steelhead (*O. mykiss*), Middle Columbia River steelhead (*O. mykiss*), Columbia River chum salmon (*O. keta*), Lower Columbia River chinook salmon (*O. tshawytscha*), Upper Willamette River chinook salmon (*O. tshawytscha*), Upper Columbia River spring run chinook salmon (*O. tshawytscha*), Southern Oregon/Northern California coast coho salmon (*O. kisutch*), and Oregon coast coho salmon (*O. kisutch*).

The NMFS has determined that the proposed action is not likely to jeopardize the continued existence of the listed species described above or adversely modify designated critical habitat. An Incidental Take Statement provides non-discretionary terms and conditions to minimize the potential for incidental take of listed species.

In addition, this document also serves as consultation on Essential Fish Habitat for coho and chinook salmon under the Magnuson-Stevens Act and its implementing regulations (50 CFR Part 600).

We appreciate the considerable effort and cooperation provided by your staff in completing this consultation. If you have any questions regarding this Opinion, please contact Marc Liverman at 503/231-2336 or Ben Meyer at 503/230-5425 of my staff in the Oregon State Branch Office.

Sincerely,

for Michael R Crouse

Donna Darm
Acting Regional Administrator

Endangered Species Act Section 7 Consultation
and
Magnuson-Stevens Act
Essential Fish Habitat Consultation

Programmatic Biological Opinion

15 Categories of Activities Requiring
Department of the Army Permits

Agency: Army Corps of Engineers, Portland District

Consultation Conducted By: National Marine Fisheries Service,
Northwest Region

Date Issued: March 21, 2001

Refer to: OSB2001-0016

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1. ENDANGERED SPECIES ACT

1.1. Background

On March 21, 2000, the National Marine Fisheries Service (NMFS) received a request from the U.S. Army Corps of Engineers, Portland District (COE) for formal consultation pursuant to section 7 of the Endangered Species Act (ESA) for programmatic coverage for 15 categories of activities requiring COE permits. The biological assessment (BA) provided with the request described COE's determination that some of the proposed activities would be "likely to adversely affect" anadromous fish species listed under the ESA and that others would be "not likely to adversely affect" listed fish. Species considered in this biological opinion (Opinion) are: Snake River sockeye salmon (*Oncorhynchus nerka*); Snake River spring/summer chinook salmon (*O. tshawytscha*); Snake River fall chinook salmon (*O. tshawytscha*); Lower Columbia River steelhead (*O. mykiss*); Upper Columbia River steelhead (*O. mykiss*); Snake River steelhead (*O. mykiss*); Upper Willamette River steelhead (*O. mykiss*); Middle Columbia River steelhead (*O. mykiss*); Columbia River chum salmon (*O. keta*); Lower Columbia River chinook salmon (*O. tshawytscha*); Upper Willamette River chinook salmon (*O. tshawytscha*); Upper Columbia River spring run chinook salmon (*O. tshawytscha*); S. Oregon/N. California Coast coho salmon (*O. kisutch*); and Oregon Coast coho salmon (*O. kisutch*).

The COE issues on average between 600 to 800 permits per year for these 15 categories. Nearly all streams with anadromous fish in the State of Oregon have species that are listed under the ESA. The requirement for consultation for these permits has resulted in a substantial workload for both COE and NMFS. Many of these activities are minor in nature and consultation results in similar requirements for approval of the project. The intent of the programmatic consultation is to develop standard local operating procedures and criteria to allow for efficient handling of a large number of similar types of projects while ensuring protection for listed species. This would expedite the permitting process for activities that would normally be allowed to proceed with specified conditions and alleviate the need for individual ESA consultation.

The objective of this Opinion is to determine whether the adoption of proposed conditions for 15 categories of activities permitted by COE throughout the State of Oregon, allowing issuance of permits for those activities without further ESA consultation and the adoption of proposed standard operating procedures is likely to jeopardize the continued existence of listed salmonids, or destroy, or adversely modify designated critical habitat. This Opinion also documents consultation under the Magnuson-Stevens Act of 1996.[1]

[1]Public Law 104-267, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Fishery Conservation and Management Act to establish new requirements for "Essential Fish Habitat" (EFH) descriptions in Federal fishery management plans (FMPs) and to require that Federal agencies consult with NMFS on activities that may adversely affect EFH. Under section 305(b)(4) of the Act, NMFS is required to provide discretionary EFH conservation and enhancement recommendations to Federal and state agencies for actions that may adversely affect EFH. However, state agencies and private parties are not required to consult with NMFS unless that action requires a Federal permit or receive Federal funding.

1.2. Proposed Action

Section 404 of the Clean Water Act requires an individual to acquire authorization from the COE for the discharge of dredged or fill materials into all waters of the United States, including wetlands. Section 10 of the Rivers and Harbors Act requires an individual to acquire authorization from the COE for the construction of any structure in or over any navigable water of the United States. The COE reviews requests from individuals and may issue a permit allowing these activities to be conducted.

The proposed action involves: 1) The adoption of permit conditions for fifteen categories of activities within the State of Oregon by COE that would preclude the need for further individual ESA consultation; and 2) the development of standard local operating procedures for these activities. The categories of activities are: Erosion control; water control; utility line stream crossings; road construction; repairs and improvements; site preparation for construction of buildings and related features; stream and wetland restoration and enhancement; placement of boat ramps; and related features including docks, floats and piers; minor discharges and excavations such as installation of outfall structures and minor repairs of previously authorized structures or fills; installation and repair of navigational aids; maintenance of existing structures and marinas; installation of small temporary floats; placing buoys, floats and other devices within anchorage or fleeting areas to facilitate storage of vessels where such areas have been established for that purpose by the U.S. Coast Guard; maintenance dredging; return water from upland contained disposal areas; and fish and wildlife harvest, attraction devices and activities.

1.2.1. Erosion Control

The object of erosion control activities is to prevent erosion of the bankline by lining the face of the bank with a hard surface, by altering the face of the bank using bio-engineering methods, or by creating structures in the water to divert the current or reduce the effects of wave action. Actions associated with these activities could involve excavation, placement of bedding material, rock, concrete, sheetpile, wood or plant material.

Standard conservation measures (permit conditions) proposed by COE are:

- The design must incorporate bioengineering principles. Options to avoid or minimize stabilization and maximize riparian vegetation must be fully explored and implemented. The analysis must consider "no build" options; i.e., address erosion by eliminating the cause when it is within the ability of the property owner, and when the solution is practicable and accomplishes the project purpose.
- The bank slope and bank protection measures shall be designed to provide a stable slope under the full range of design flows and predicted bed elevation changes. The applicant must provide documentation which demonstrates that the proposed measures will be stable and will provide the required level of bank protection.
- Repairs of previously authorized projects which involve reconstruction shall comply with the conditions for new construction. Minor repairs shall incorporate bioengineering principles and revegetation of the bankline whenever practicable.

1.2.2. Water Control

The object of water control activities is the control the flow of water to prevent or reduce the risk of flooding or to maintain drainage. Actions associated with these activities could involve excavation, grading, fill, or placement of concrete for tidegates and pump stations.

No standard permit conditions are proposed.

1.2.3. Utility Lines

The object of these activities is the installation or repair of pipes or pipelines utilized in the transmission of gas or liquids; or cables, lines or wires used to transmit electricity or communication. Actions associated with these activities could involve excavation; temporary sidecasting of excavated material; backfilling of the trench; and restoration of the work site to pre-construction contours and vegetation.

Proposed standard permit conditions are:

- Directional drilling shall be the preferred method of crossing any waterways. If directional drilling is not feasible, the work shall be performed when the stream bed is dry. Open trenching in running waters or temporary stream diversions are not covered under this consultation.
- There must be no change in preconstruction contours.
- The top 12 inches of soil from the excavation shall be stockpiled and replaced into the top of the trench.
- Associated roads or other encroachments into the riparian area must be restricted to the maximum extent practicable and located to minimize their impact. Temporary roads must be removed in their entirety, and the site restored as soon as construction is completed.
- Banklines shall be returned to original slopes and revegetated with native vegetation.
- The applicant shall provide documentation that shows that the utility line will not be exposed due to any lateral migration, head cutting or general scour in the stream.

1.2.4. Road Construction, Repairs and Improvements

These activities include new highway construction, improvement of an existing roadway, and replacement of culverts. Actions could involve excavation, grading, filling, placement of culverts, construction of bridges and construction of drainage features.

Proposed standard permit conditions are:

- No bridge piers or abutments will be constructed within the 2 year floodplain. Culvert replacements or modifications shall be done in the dry, unless it can be demonstrated that no listed or proposed fish are present during project activities. The preferred culvert designs and their order of preference are found in Oregon Department of Fish and Wildlife's (ODFW) Standards and Criteria for Stream-Road Crossings.

- In streams that contain anadromous fish, or in streams listed or proposed for listing as critical habitat under the ESA, the crossing must be designed to comply with the ODFW Standards and Criteria for Stream-Road Crossings as approved by NMFS.
- Unless otherwise approved, passage must be designed to meet the requirements of the weakest salmonid species, or life stage, present at the time(s) migration or movement occur.
- Road crossings and bridge structures shall be designed to direct surface drainage into areas or features (such as biofiltration swales or other treatment facilities) to prevent erosion of soil and introduction of other pollutants directly into waterways or wetlands.
- The width of the fill must be limited to the minimum necessary for the actual crossing.
- Road maintenance must comport with Oregon Department of Transportation (ODOT) Maintenance Best Management Practices Guide.

1.2.5. Site Preparation for Construction of Buildings and Related Features

The object of these actions is the preparation of a site for construction of any type of building, driveways, parking areas, garages and storage or utility buildings. Actions could involve excavation, filling or grading.

Proposed standard permit conditions are:

- Buildings or other structures may be placed no closer than 75 feet from the top-of-bank of any fish-bearing stream, and no closer than 25 feet from the top-of-bank of any nonfish-bearing tributary to such a stream.
- Any vegetated area which is temporarily disturbed during construction within designated critical habitat shall be replanted with native plants. Areas along stream banks shall be restored and maintained with native riparian vegetation.

1.2.6. Stream and Wetland Restoration and Enhancement

This category may include installation, removal and maintenance of small water control structures, dikes, and berms; installation of current deflectors; enhancement, restoration or creation of riffle and pool stream structure; placement of in-stream habitat structures; modifications of the stream bed and/or banks to restore or create stream meanders; the backfilling of artificial channels and drainage ditches; removal of existing drainage structures; construction of small nesting islands; construction of open water areas; activities needed to reestablish vegetation; and other activities as described in Nationwide Permit 27, Stream and Wetland Restoration Activities.

Proposed standard permit conditions are:

- Water will not be withdrawn from any waterbody containing anadromous fish.
- The work shall not create an impediment to fish passage and there shall be no change to stream gradient.
- Any outfall structures associated with this activity shall be placed to prevent discharge water from affecting aquatic vegetation.

- Water being discharged into an anadromous fish bearing stream shall not exceed 4 feet per second (fps) at an outfall or diffuser port to avoid attracting fish.
- The slope of the facility should be designed such that fish cannot be trapped in the impoundment or wetland.

1.2.7. Boat Ramps

Construction of boat ramps may include excavation, grading, and placement of poured or pre-cast concrete, and the construction of related features including docks, floats and piers.

Proposed standard permit conditions are:
- Use of non-treated wood, plastics, steel and concrete for structures is required.
- Flotation shall be encapsulated to permanently prevent the breakup of loss of flotation material.

1.2.8. Other Minor Discharges and Excavations

This category includes minor discharges and excavations such as small structural fills, minor excavations or dredging such as that necessary for culvert maintenance, installation of outfall structures and minor repairs of previously authorized structures or fills.

Proposed standard permit conditions are:
- All dredged or excavated material must be removed to an upland location where it cannot re-enter the waterbody.
- Maintenance of culverts shall be done in a manner such that there shall be no equipment in the stream. Any roads placed to access the culvert shall be removed and vegetation restored.
- Structural fills with materials such as concrete or sand shall be placed into tightly sealed forms or cells.
- Stream diversions are not covered by this consultation.
- Effluent from outfall structures must be authorized, conditionally authorized, specifically exempted or otherwise in compliance with regulations issued under the National Pollutant Discharge Elimination System program.
- Discharged water shall not exceed 4 fps at either the outfall or diffuser port.
- Any intake structure shall meet NMFS screening criteria.
- Areas of high benthic productivity shall be avoided to the maximum extent practicable. If the project occurs in an estuary or other typically highly productive area, benthic sampling is required.

1.2.9. Installation and Repair of Navigational Aids

Activities under this category include the placement of permanent and temporary navigational aids such as mooring buoys and channel markers.

No standard permit conditions are proposed.

1.2.10. Maintenance of Existing Structures and Marinas

This category includes the maintenance, repair and relocation of existing structures within an authorized marina.

Proposed standard permit conditions are:

- Walkways wider than 4 feet shall include grating or translucent panels to maintain a minimum of 60% of the ambient open water light.
- Use of non-treated wood, plastics, steel and concrete for structures is required.
- Flotation shall be encapsulated to permanently prevent the breakup or loss of flotation material.
- Structures may only be moved within the existing footprint of the moorage or into deeper water. Structures may not be moved to water shallower than 20 feet (MLLW). Where the water along the shoreline is deeper than 20 feet, all structures shall be located at least 30 feet away from the shoreline.
- All floats shall be placed in water deep enough to ensure they do not ground out at low water. At least a foot of depth shall be maintained between the river bed and the bottom of any float. Mooring buoys shall be placed in water deep enough so that moored boats never ground out or prop wash the bottom.

1.2.11. Installation of Small Temporary Floats

This category includes temporary buoys, markers, small floating docks, and similar structures placed for recreational use during specific events such as water skiing competitions and boat races or seasonal use provided that such structures are removed within 30 days after use has been discontinued.

Proposed standard permit conditions are:

- Floats may not be installed more than 7 days in advance of the event and must be removed within 5 days of the end of the event.
- Floats or other structures are not allowed in areas with submerged aquatic vegetation.
- Floats shall not ground out at low water, and at least a foot of depth shall be maintained between the river bed and the bottom of any float.
- Flotation shall be entirely contained and encapsulated to permanently prevent the breakup or loss of flotation material.
- Floating storage units or boat houses are not included in this consultation.

1.2.12. Structures in Fleeting and Anchorage Areas

This category includes buoys, floats and other devices placed within anchorage or fleeting areas to facilitate storage of vessels where such areas have been established for that purpose by the U.S. Coast Guard.

1.2.13. Maintenance Dredging

This category includes maintenance dredging of existing marinas to maintain the authorized depth for ingress and egress.

Proposed standard permit conditions are:

- Dredging shall not be deeper than the authorized project depth and shall be conducted during the approved in-water work period. The side slopes of the dredged area shall be graded to a maximum slope of 3 feet horizontal to 1 foot vertical to prevent the deepening of shallow water areas by sloughing.
- Dredging during the approved work window may be done by any method.
- If dredging outside of the approved window is warranted the following will apply: In waters with depths between 20 and 30 feet a clamshell dredge shall be used during periods of peak juvenile out migration times (as defined by ODFW). In waters deeper than 30 feet dredging may be conducted by either a clamshell or hydraulic dredge at any time. In waters less than 20 feet, dredging shall be conducted during the approved work window only.
- When using a hydraulic dredge, the intake of the dredge should be operated at or below the surface of the material being removed. It can be raised a maximum of 3 feet above the bed for brief periods of purging or flushing.
- Material shall be placed in an approved upland site.

1.2.14. Return Water From Upland Contained Disposal Areas

This category includes return water from an upland, contained dredged material disposal area. The return water from a contained disposal area is administratively defined as a discharge of dredged material by 33 CFR 323.2(d) even though the disposal itself occurs on the upland and thus does not require a Section 404 permit.

Proposed standard permit conditions are:

- Water being discharged shall not exceed 4 cfs at either the outfall or diffuser port.

1.2.15. Fish and Wildlife Harvest, Attraction Devices and Activities

This category includes the installation and use of fish and wildlife harvesting devices and activities such as clam harvesters, oyster beds, etc.

Proposed standard permit conditions are:

- Areas of high benthic productivity shall be avoided. If the project occurs in an estuary or other typically highly productive area, benthic sampling is required prior to any activities.
- The project must not result in a major change in substrate (i.e. sand bottom to rocky reef, etc.).
- Commercial harvest of shellfish by means of a mechanical or hydraulic escalator type of equipment is not covered by this consultation.

1.2.16. General Conditions

In addition to specific conditions for activities, COE also proposes the following general conditions for all activities:

- Work shall not inhibit fish passage. Structures and culverts must meet standards and criteria as described in the ODFW's Standards and Criteria for Stream Crossings.
- Only clean, suitable material may be used as fill.
- Temporary fills must be entirely removed and the site restored to pre-existing elevation.
- In-water work shall be conducted during the ODFW approved work window.
- Work shall be done from the top of the bank. Heavy equipment use within the active flowing channel is not part of this consultation.
- Permittees shall be required to use equipment having the least impact.
- Fill material shall be placed, not randomly dumped.
- Discharges into spawning areas or areas with submerged aquatic vegetation are not covered by this consultation.
- Permittees must take all practicable steps to control erosion during construction and establish permanent erosion protection upon completion of the work.
- Construction impacts shall be confined to the minimum area necessary to complete the work. Damaged areas shall be restored to pre-work conditions. Native plant species shall be used that are specific to the project vicinity or region of the state where the activity is occurring.

1.2.17. Standard Operating Procedures

The COE proposes that standard operating procedures be utilized by COE permit evaluators to standardize evaluations and conditions or restrictions attached to permits. The permit evaluator will determine the presence or absence of listed species in the vicinity of the proposed project area and make a determination as to whether the activity may affect the listed or proposed species. If it may affect, the evaluator will condition the permit to avoid and/or minimize impacts. If the project can meet the terms and conditions established in this programmatic consultation, no further consultation with NMFS will be required. If it cannot meet the terms and conditions set forth in this consultation, individual consultation with NMFS for the project will be requested.

In addition, COE is proposing to maintain a database of permits issued and to periodically report this information to determine the effectiveness of the programmatic consultation in minimizing impacts to listed anadromous fish.

1.3. Biological Information and Critical Habitat

The action area is defined by NMFS regulations (50 CFR 402) as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area is the State of Oregon, specifically any streams that may contain anadromous salmonids. Essential habitat features for salmonids are: (1) Substrate; (2) water quality; (3) water quantity; (4) water temperature; (5) water velocity; (6) cover/shelter; (7) food (juvenile only); (8) riparian vegetation; (9) space; and (10) safe passage conditions (50 CFR 226). The proposed action may affect all of these essential habitat features

References for further background on listing status, biological information and critical habitat elements can be found in Table 1.

1.4. Evaluating Proposed Actions

The standards for determining jeopardy are set forth in Section 7(a)(2) of the ESA as defined by 50 CFR 402 (the consultation regulations). NMFS must determine whether the action is likely to jeopardize the listed species and/or whether the action is likely to destroy or adversely modify critical habitat. This analysis involves the initial steps of: (1) Defining the biological requirements of the listed species; and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NMFS evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NMFS must consider the estimated level of mortality attributable to: (1) Collective effects of the proposed or continuing action; (2) the environmental baseline; and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed species' life stages that occur beyond the action area. If NMFS finds that the action is likely to jeopardize, NMFS must identify reasonable and prudent alternatives for the action.

NMFS also evaluates whether the action, directly or indirectly, is likely to destroy or adversely modify the listed species' critical habitat. The NMFS must determine whether habitat modifications appreciably diminish the value of critical habitat for both survival and recovery of the listed species. The NMFS identifies those effects of the action that impair the function of any essential feature of critical habitat. The NMFS then considers whether such impairment appreciably diminishes the habitat's value for the species' survival and recovery. If NMFS concludes that the action will adversely modify critical habitat, it must identify any reasonable and prudent alternatives available.

For the proposed action, NMFS' jeopardy analysis considers direct or indirect mortality of fish attributable to the action. NMFS' critical habitat analysis considers the extent to which the proposed action impairs the function of essential elements necessary for migration, spawning, and rearing of the listed species under the existing environmental baseline.

Table 1. References for additional background on listing status, critical habitat, protective regulations, and biological information for the listed species addressed in this Opinion.

Species	Listing Status	Critical habitat	Protective Regulations	Biological Information, Population Trends
Snake River sockeye salmon	November 20, 1991, 56 FR 58619 Endangered	December 28, 1993, 58 FR 68543	ESA prohibition on take applies	Waples *et al*. 1991a; Burgner 1991; ODFW and WDFW 1998
Southern Oregon/Northern California coho salmon	June 18, 1997, 62 FR 33038 Threatened	May 5, 1999 64 FR 24049	July 18, 1997 62 FR 38479	Weitkamp *et al*. 1995; NMFS 1997a; Sandercock 1991; Nickelson *et al*. 1992
Oregon Coast coho salmon	August 10, 1998, 63 FR 42587 Threatened	February 16, 2000 65 FR 7764	July 10, 2000 65 FR 42423	Weitkamp *et al*. 1995; Nickelson *et al*. 1992; NMFS 1997b; Sandercock 1991
Upper Columbia River steelhead	August 18, 1997, 62 FR 43937 Endangered	February 16, 2000 65 FR 7764	ESA prohibition on take applies	Busby *et al*. 1995; Busby *et al*. 1996; ODFW and WDFW 1998
Snake River Basin steelhead	August 18, 1997, 62 FR 43937 Threatened	February 16, 2000 65 FR 7764	July 10, 2000 65 FR 42423	Busby *et al*. 1995; Busby *et al*. 1996; ODFW and WDFW 1998
Lower Columbia River steelhead	March 19, 1998, 63 FR 13347 Threatened	February 16, 2000 65 FR 7764	July 10, 2000 65 FR 42423	Busby *et al*. 1995; Busby *et al*. 1996; ODFW and WDFW 1998
Upper Willamette River steelhead	March 25, 1999, 64 FR 14517 Threatened	February 16, 2000 65 FR 7764	July 10, 2000 65 FR 42423	Busby *et al*. 1995; Busby *et al*. 1996; ODFW and WDFW 1998
Middle Columbia River steelhead	March 25, 1999, 64 FR 14517 Threatened	February 16, 2000 65 FR 7764	July 10, 2000 65 FR 42423	Busby *et al*. 1995; Busby *et al*. 1996; ODFW and WDFW 1998
Columbia River chum salmon	March 25, 1999, 64 FR 14508 Threatened	February 16, 2000 65 FR 7764	July 10, 2000 65 FR 42423	Johnson *et al*.1997; Salo 1991; ODFW and WDFW 1998
Snake River Fall chinook salmon	April 22, 1992, 57 FR 14653 Threatened	December 28, 1993, 58 FR 68543	July 22, 1992 57 FR 14653	Waples *et al*. 1991b; Healey 1991; ODFW and WDFW 1998
Lower Columbia River chinook salmon	March 24, 1999, 64 FR 14308 Threatened	February 16, 2000 65 FR 7764	July 10, 2000 65 FR 42423	Myers *et al*.1998; Healey 1991; ODFW and WDFW 1998
Snake River spring/summer chinook salmon	April 22, 1992, 57 FR 14653 Threatened	December 28, 1993, 58 FR 68543 and October 25, 1999, 64 FR 57399	April 22, 1992 57 FR 14653	Matthews and Waples 1991; Healey 1991; ODFW and WDFW 1998
Upper Willamette River chinook salmon	March 24, 1999, 64 FR 14308 Threatened	February 16, 2000 65 FR 7764	July 10, 2000 65 FR 42423	Myers *et al*.1998; Healey 1991; ODFW and WDFW 1998

Upper Columbia River spring run chinook salmon	March 24, 1999, 64 FR 14308 Endangered	February 16, 2000 65 FR 7764	ESA prohibition on take applies	Myers *et al*.1998; Healey 1991; ODFW and WDFW 1998

1.4.1. Biological Requirements

The first step in the methods NMFS uses for applying the ESA section 7(a)(2) to listed salmon is to define the species' biological requirements that are most relevant to each consultation. NMFS also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess to the current status of the listed species, NMFS starts with the determinations made in its decision to list the species for ESA protection and also considers new data available that is relevant to the determination.

The relevant biological requirements are those necessary for salmonids to survive and recover to naturally reproducing population levels at which protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance its capacity to adapt to various environmental conditions, and allow it to become self-sustaining in the natural environment.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful spawning, incubation and migration, rearing habitat and over-wintering refugia. Salmon survival in the wild depends upon the proper functioning of certain ecosystem processes, including habitat formation and maintenance. Restoring functional habitats depends largely on allowing natural processes to increase their ecological function, while at the same time removing adverse impacts of current practices. In conducting analyses of habitat-altering actions, NMFS usually defines the biological requirements in terms of a concept called Properly Functioning Condition (PFC) and utilizes a "habitat approach" to its analysis.[2] The current status of listed salmonids in the State of Oregon, based upon their risk of extinction, has not significantly improved since the species were listed. The NMFS is not aware of any new data that would indicate otherwise.

1.4.2. Environmental Baseline

Regulations implementing section 7 of the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. The environmental baseline also includes the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of State and private actions that are contemporaneous with the consultation in progress. The action area is defined

[2] National Marine Fisheries Service, Northwest Region. 26 August 1999. The Habitat Approach: Implementation of Section 7 of the Endangered Species Act for Actions Affecting the Habitat of Pacific Anadromous Salmonids. Guidance memorandum from Assistant Regional Administrators for Habitat Conservation and Protected Resources to staff. 13 pages. NMFS, 525 NE Oregon St, Ste 500, Portland, OR 97232-2737.

in 50 CFR 402.02 to mean "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."

For the purposes of this consultation, the action area includes all waters within the COE's regulatory jurisdiction for activities described in this consultation throughout the State of Oregon and within the range of listed salmon and steelhead. The action area may also extend upstream or downstream, based on the potential of the permitted activities to impair fish passage, riparian succession, the hydrologic cycle, the erosion, transportation and deposition of sediments, and other ecological processes related to the formation and maintenance of salmon habitats. Indirect effects may occur throughout the watershed where other activities depend on actions described in this opinion for their justification or usefulness.

The analysis presented in this section is based on the *Oregon State of the Environment Report 2000*, published by the Oregon Progress Board in September 2000 (Risser 2000). The *Report* was developed and written by a 23- member team of volunteer scientists and contributors drawn primarily from universities throughout Oregon and led by Dr. Paul Risser, president of Oregon State University. The team's mandate was to describe the conditions and trends of Oregon's environment, identify areas at risk, and suggest environmental indicators to help track environmental progress in the state.

Dozens of individual scientists and agency staff offered assistance and advice to the scientific team working on the *Report*. An advisory committee composed of leaders from the business community, the legislature, interest groups, communities, and concerned citizens met quarterly with the Science Panel to oversee each step of the process. Their work was funded by a broad consortium of public and private sources. Before it was completed, the *Report* was subjected to a thorough scientific review by 24 independent scientists. Consequently, the NMFS concludes that the *Report* contains the best available scientific information on the environmental baseline. The purpose of the remainder of this section is to use substantial highlights of the *Report* to build the context for the nondiscretionary measures included in the incidental take statement issued with this opinion, as well as for the discretionary conservation recommendations that the COE should carry out consistent with its section 7(a)(1) responsibility.

The *Report* provides a comprehensive review of Oregon's environmental baseline in terms of all of its interrelated parts and natural processes. It was developed using a combination of analyses of existing data and best professional scientific judgment. Aquatic ecosystems, marine ecosystems, estuarine ecosystems, freshwater wetlands, and riparian ecosystems were among the resources considered. A set of indicators of ecosystem health was proposed for each resource system and as benchmarks for the State's use in evaluating past decisions and for planning future policies to improve Oregon's environment and economy. The *Report* also included findings regarding the environmental health of Oregon's eight ecoregions and conclusions about future resource management needs. Highlights of the *Report* follow.

Oregon's currently available water supplies are fully or often over allocated during low flow months of summer and fall. In the Columbia Plateau ecoregion, less that 20 percent of instream water rights can expect to receive their full allocation nine months of the year. In the Willamette Valley and Cascades ecoregions, more than 80 percent of the instream water rights can expect to receive their full allocation

in the winter, but only about 25 percent in the early fall. Increased demand for water is linked to the projected 34 percent increase in human population over the next 25 years in the state. Further, some climate models predict 10 to 25 percent reductions in late spring-summer-early fall runoff amounts in the coming decades.

Water quality in Oregon was categorized using the Oregon Water Quality Index (OWQI). The OWQI is a large, consistent and reliable data set that covers the state. It is based on a combination of measurements of temperature, dissolved oxygen, biochemical oxygen demand, pH, ammonia and nitrate nitrogen, total phosphorus, total solids and fecal coliform. Because water quality is influenced by streamflow, water quality indices are measured during high and low flow periods.

Generally, water quality is poor during low flow periods, except in mountainous areas. Instances of excellent or good water quality occur most often in the forested uplands. Poor or very poor water quality occurs most often in the non forested lowlands where land has been converted to agricultural and urban uses. Most ecoregions include some rivers and streams with excellent water quality and other with very poor water quality. Only the Cascades ecoregion has excellent water quality overall as shown by average OWQI measurements. The Willamette Valley, Columbia Plateau, Northern Basin and Range and southern end of the Eastern Cascade Slope ecoregions have poor water quality indices. The effects of pesticides and fertilizers, especially nitrates, on water supplies and aquatic habitats are a significant concern. Almost all categories of water pollution are growing, as are hazardous waste emissions, air pollution, toxic releases, and waste generation.

Oregon’s coastal ocean is part of the larger ecological transition zone known as the Northern California Current Large Marine Ecoregion. This area is strongly influenced by both the subarctic waters of the Gulf of Alaska and the warmer, subtropical waters of California. The complexity and natural variability of marine environments makes them difficult and expensive to study and limits the scientific certainty that can be ascribed to assessments of their “ecological health.”

The condition of marine fisheries is mixed, with many stocks in good shape and others threatened by overfishing and other pressures. Some species of groundfish have declined to very low levels and the impact of mobile fishing gear on the diversity and productivity of seabed habitats that support groundfish is a concern. The collapse and subsequent closure of the coho salmon fishery have resulted in increased commercial and recreational fishing pressure on nearshore subtidal rocky reef areas, a trend that is likely to continue.

Natural variability and extremes in temperature, salinity, tides and river flow make estuarine ecosystems and organisms relatively resilient to disturbance. However, alterations such as filling, dredging, the introduction of nonnative species, and excessive waste disposal have changed Oregon's estuaries, reducing their natural resiliency and functional capacity.

The most significant historical changes in Oregon's estuaries are the diking, draining and filling of wetlands and the stabilization, dredging and maintenance of navigation channels. Between 1870 and 1970, approximately 50,000 acres or 68 percent of the original tidal wetland areas in Oregon estuaries

were lost. Despite these significant historical wetland conversions and continuing degradation by pollutants, nuisance species, and navigational improvement, much of the original habitat that existed in the mid-1800s is still relatively intact and under protection of local zoning plans. Hundreds of acres of former estuarine marshes are now being restored.

Nonnative species now comprise a significant portion of Oregon's estuarine flora and fauna. Some, such as the European green crab, pose serious threats to native estuarine communities. Consumptive use of fresh water in the upper watersheds has reduced freshwater inflow to estuaries by as much as 60 to 80 percent, thus reducing the natural dilution and flushing of pollutants. Other significant concerns include excessive sediment and runoff pollution from local and watershed source, and pressures associated with population and tourism growth.

Oregon contains approximately 114,500 miles of rivers and streams. No statewide measurements exist of the area of riparian vegetation, although some estimates have been made for more localized regions. Using the conservative estimate of a 100-yard riparian corridor on each side of the stream, the total area of riparian habitats for flowing water in Oregon may be 22,900 square miles. That is equal to approximately 15 percent of the total area of the state.

Healthy riparian areas retain the structure and function of natural landscapes as they were before the intensive land use and land conversion that has occurred over the last 150 to 200 years. Land use activities have reduced the numbers of large trees, the amount of closed-canopy forests, and the proportion of older forests in riparian areas. In western Oregon, riparian plan communities have been altered along almost all streams and rivers.

In the western Cascades, Willamette Valley, Coast Range, and Klamath Mountains, riparian areas on privately owned land are dominated by younger forests because of timber harvest, whereas riparian areas on public lands have more mature conifers. Old coniferous forests now comprise approximately 20 percent of the riparian forests in the Cascades, but only 3 percent in the Coast Range. Older forests historically occurred along most of the McKenzie River, but now account for less than 15 percent of its riparian forests. Along the mainstem of the upper Willamette River, channel complexity has been reduced by 80 percent and the total area of riparian forest has been reduced by more than 80 percent since the 1850s. Downstream portions of the Willamette River have experienced little channel change, but more than 80 percent of the historical riparian forest has been lost.

Beginning in the early 1800s, riparian areas in eastern and southern Oregon were extensively changed by trapping beaver, logging, mining, livestock grazing, agricultural activities, and associated water diversion projects. Very little of the once extensive riparian vegetation remains to maintain water quality and provide habitats for threatened fish species. Dams have affected flow, sediment, and gravel patterns, which in turn have diminished regeneration and natural succession of riparian vegetation along downstream rivers. Introduced plant species pose a risk to some riparian habitat by dominating local habitats and reducing the diversity of native species. Improper grazing in riparian areas is another significant threat.

Sixty-three species or recognized subspecies of native freshwater fish occur in Oregon. Currently, 14 of those species or subspecies are listed under the ESA as threatened or endangered. An additional 15 species are considered potentially at-risk and are listed as candidate species. Five of the listed species are salmon and trout, and 226 genetically distinct populations face significant risk of extinction. Thus, 45 percent of Oregon's freshwater fish species have declined and are at some risk of extinction. Among the 50 states, Oregon ranks fifth for the greatest number of listed fish species. In response to concern about the health of salmon populations, commercial and sport harvests have been sharply curtailed, and fishing for coastal coho salmon was eliminated entirely from 1994 to 1998.

Occurrence of tumors, lesions, and deformities in fish is a direct measure of fish health. Systematic data regarding this problem are not available statewide. In the Willamette River, skeletal deformities comprised less than 5 percent of the sampled population upstream from Corvallis, 20 percent between Corvallis and Newberg, and 56 percent of the sampled population in the Newberg pool.

More than 32 species of freshwater fish have been introduced into Oregon, and are now self-sustaining, making up approximately one-third of Oregon's freshwater fish fauna. Introduced species are frequently predators on native species, compete for food resources, and alter freshwater habitats. In 1998, introduced species were found to comprise 5 percent of the number of species found in the upper Willamette River, but accounted for 60 percent of the observed species in the lower river near Portland.

In its conclusions, the *Report* makes it clear that despite Oregon's success at resolving resource problems in the past, the existing policies and programs may not be sufficient to address current environmental challenges. Many problems are most critical in lowlands of major river basins, where most Oregonians live and work. Aquatic systems, which integrate many kinds of activities, are most affected and most a risk. Reintroduction of natural processes is important to sustaining biological diversity. Water quality is poor and riparian structure and function has been significantly altered from historical conditions. These and other problems reflect the cumulative effects of many small, diffuse, individual decisions and actions. Finding solutions to these problems will require new approaches to monitor conditions and trends in the environment, like those suggested in the *Report*, as part of an overall statewide sustainability strategy.

The NMFS concludes that not all of the biological requirements of the species within the action area are being met under current conditions, based on the best available information on the status of the affected species; information regarding population status, trends, and genetics; and the environmental baseline conditions within the action area. Significant improvement in habitat conditions over those currently available under the environmental baseline is needed to meet the biological requirements for survival and recovery of these species. Any further degradation of these conditions would have a significant impact due to the amount of risk they presently face under the environmental baseline.

1.5. Analysis of Effects

1.5.1. Effects of Proposed Actions

The effects of the proposed actions are outlined by activity category. However, many of the effects may be valid for more than one category. For example, turbidity impacts resulting from in-water work may occur in the categories of erosion control; water control; utility lines; road construction; site preparation for construction of buildings; stream restoration; boat ramps; other minor discharges; maintenance dredging; and return water from upland contained disposal areas. The effects may only be listed in one activity category section, but are valid for all categories that have that effect.

1.5.1.1. Erosion Control

Continuous rock riprap revetments and concrete bulkhead can adequately armor banklines at a single site, but simultaneously destroy or degrade other bankline features. By design, the hardening measures transfer and focus hydraulic forces to other areas. Nearshore topography is scoured, critical fish habitats are often degraded or destroyed, terrestrial habitat is lost, and erosion of neighboring property can be accelerated.

The value of rearing habitat along stream banks will be altered as a result of the placement of riprap. On a reach scale, riparian vegetation and streambed substrate will be lost, resulting in a loss of habitat complexity. Stream and flood plain interactions, and stream processes essential to support listed fish will be lost. The result will be a decline in fish use at the site (Bearner and Henderson 1998, Peters et al. 1998). The streambank hardening not only has a direct effect on stream function along the bank line but can contribute significantly to stream channelization and loss of critical stream process. Over the long term, the placement of riprap will result in the consolidation or hardening of the stream bank, and the modification of stream hydraulics and hydrology, and a reduction in the future supply of large woody material (LW). On a large scale, the continued placement of riprap will lead to a continual degradation of PFC or riparian function that is necessary to support viable fish populations. These effects can be offset with compensatory mitigation.

For the purpose of this consultation, bioengineering is defined as the use of plant materials and organic structural elements (i.e. root wads, logs, etc) for stabilizing eroding banklines. Vegetation must be the primary structural component, and the use of rock or similar hard material, must be held to a practical minimum and located at scour critical points only.

When bioengineered elements are incorporated into the rock, ecosystem processes are enhanced relative to bank hardening without any bioengineering. The root systems are flexible, regenerative, and respond favorably to hydraulic disturbance - characteristics which exceed the performance of conventional geotextile alternatives. Fish habitat is enhanced by incorporating root wads and downed trees in the designs, beneficial scour holes are created in acceptable sites, and low energy resting zones are developed down-gradient of instream structures.

Short-term increases in turbidity and sedimentation resulting from construction will be offset by reduced erosion of soil in the scour area. Larger juvenile and adult salmon appear to be little affected by ephemerally-high concentrations of suspended sediments that occur during most storms and episodes of snow melt. However, other research demonstrates that feeding and territorial behavior can be

disrupted by short-term exposure to turbid water. At moderate levels, turbidity has the potential to adversely affect primary and secondary productivity, and at high levels, has the potential to injure and kill adult and juvenile fish. Localized increases of turbidity during in-water work will likely displace fish in the project area and disrupt normal behavior. The effects are expected to be temporary and localized.

In-water work may be required to build a toe trench to anchor the embankment. The operation of equipment in the stream has the potential to directly take listed fish, and disrupt normal behavior. Measures can be taken, such as isolation of the work area and choosing appropriate equipment, to minimize the potential for take. Operation of equipment in the channel or in riparian areas increases the risk of a fuel spill which could kill or injure aquatic organisms.

1.5.1.2. Water Control[3]

Modification of water levels and flow regimes are likely to result in long-term, simultaneous, adverse alteration of many essential components of salmonid habitats in addition to the relatively short-term effects discussed in the biological assessment. Water edge habitat, flow rates, channel conditions, and the direct effects of artificial structures are significant examples. Water control activities have additional long-term adverse effects in tidal marsh and estuarine habitats.

Water edge habitats are modified primarily through changes in water level. These changes may be caused by water level manipulations, channelization and ditching. Major environmental effects are deepening, shallowing and fluctuations in water depth and associated flooding, exposure, and flooding/exposure variation. Even slight changes in water level or the cyclic annual variation in water level may greatly influence the composition of shallow water vegetation. Depth sensitive species, such as submerged, floating leaf, and emergent species, can be damaged or killed by significantly increasing either depth or exposure. Lowering water levels can also eliminate water-edge vegetation and can result in a broad barren zones around water bodies that are subject to heavy erosion during periods of exposure. Reduction or loss of function in water edge vegetation can thus initiate a chain of biological events including decreased primary productivity, reduction in allochthonous energy and organic matter contribution, reduction of benthic invertebrates and fish communities, loss of preferred food resources, altered trophic and competitive relationships, altered community composition, direct mortality, and reduced populations.

Water edge habitats are also important for physical habitat elements. These areas provide a natural filtration zone between land and open water that traps sediments eroded from banks and shores thus reducing open water turbidity, and largely regulate nutrient levels in the entire aquatic system by trapping large quantities of nutrients. For all these reasons, water edge vegetation is important in

[3] Adapted from R.M. Darnell, Impacts of construction activities in wetlands of the United States (April 1976), U.S. Environmental Protection Agency, Ecological Research Series, Report No. EPA-600/3-76-045, Environmental Research Laboratory, Office of Research and Development, Corvallis, OR. 392pp.

balancing natural aquatic systems and its removal can have substantial adverse effects on protected species and habitats.

Stream flow rates are affected by water control activities. Drainage projects, channelization and ditching may lead to very rapid runoff, sudden peak flows, and increased flow velocities during storm events. This is followed by very low flow during periods between precipitation events. Flow velocity is a dominant factor affecting stream life. Most aquatic species are adapted to and require particular flow velocities. Ranges of tolerance are rather narrow, and they often vary with different stages of the life history. Spawning, egg development, juvenile growth, adult life, and migratory behaviors are all influenced directly by flow rates. Indirectly, velocity may determine food and habitat availability through its influence on invertebrate life, turbidity, bottom erosion, and sedimentation.

Very high velocities associated with flood flows generally have adverse effects on the stream biota by destroying habitat cover, sweeping away organic matter, covering pools and riffles with sediment and debris, damaging invertebrate populations, decreasing food supply, and altering community composition. Low velocities may be even more damaging for salmonids whose survival is closely related to dry season base flow conditions. Low flows are associated with low oxygen and high carbon dioxide tensions which may become lethal to fishes. Low flows through the interstices of riffles reduce the numbers of salmonids hatched, and reduce the size and variability of those that do hatch. Discontinuous flows reduce stream habitats to a series of isolated pools that stagnate and expose surviving aquatic life to greater predation by aquatic and terrestrial animals. Unstable or highly variable stream flow creates a habitat that few species can tolerate and can cause extremely high levels of mortality for salmonid fry. Flow rates also influence the timing, rate, and path of salmonid migration.

Construction of dikes and levees, channelization of streams, and excavation of drainage ditches can greatly lower riparian water tables, increase the rate of surface runoff, increase stream velocities, enhance bank and bottom erosion, and transport large sediment loads. Dredge spoil deposited on adjacent banks can cover vegetation and eliminate riparian habitats. Sedimentation of downstream areas where natural stream gradients still exist may cause flooding, modification of riparian habitats, alteration of water edge habitat, and changes in flow. Long-term effects include reduction in the size and diversity of the stream habitat, destruction of core productive areas, greatly reduced invertebrate and fish populations, and large changes in community composition for projects authorized by the COE, these effects can be offset with compensatory mitigation.

Tidal marshes are highly variable but typically have freshwater vegetation at the landward side, saltwater vegetation at the seaward side, and a gradient of species in between that are in equilibrium with the prevailing climatic, hydrographic, geological, and biological features of the coast. These systems normally drain through highly dendritic tidal creeks that empty into the bay or estuary. Freshwater entering along the upper edges of the marsh drain across the surface and enter the tidal creeks. Dikes, levees, ditches or other water controls at the upper end of a tidal marsh can cut off all tributaries feeding the marsh, prevent freshwater flushing, prevent annual flushing, prevent annual renewal of sediments and nutrients, and end formation of new marshes. Water controls within the marsh proper intercept and carry away freshwater drainage, block freshwater from flowing across

seaward portions of the marsh, increase the speed of runoff of freshwater to the bay or estuary, lower the water table, permit saltwater intrusion into the marsh proper, and create migration barriers for aquatic species. In deeper channels where reducing conditions prevail, large quantities of hydrogen sulfide are produced that are toxic to marsh grasses and other aquatic life. Acid conditions of these channels can also result in release of heavy metals from the sediments.

Long-term effects on the tidal marsh include land subsidence (sometimes even submergence), soil compaction, conversion to terrestrial vegetation, greatly reduced invertebrate populations, and general loss of productive wetland characteristics. Salt water intrusion resulting from water control actions in tidal marshes and estuaries increases their salinity and reduces or eliminates the broad mixing zone where young salmonids first encounter the marine environment and may be swept out into it before they are ready. Loss of these low salinity environments also reduces estuarine fertility, restricts suitable habitat for aquatic species, and creates abnormally high salinity during drought years. Low salinity environments form a barrier that prevents the entrance of many marine species, including competitors, predators, parasites and diseases. Limitation of freshwater inflow may also interfere with the reproduction of coastal species whose larval migration into estuaries depends on the availability of strong bottom currents. Each of these effects may have severe adverse consequences for survival of salmonid smolts entering the marine environment.

The direct effects of artificial structures, except tide gates, are explained in the section on boat ramps below. A tide gate is an opening through which freshwater may flow freely seaward during low tides, but which closes automatically and prevents the seawater from flowing in the other direction at high tides. The adverse effects of tide gates in tidal marshes and estuaries are similar to those of other water control actions, except that in many places the gates hinder or prevent salmonid passage into and out of winter rearing areas or upstream spawning habitats. Tide gates also can cause prolonged freshwater flooding of tidal marsh areas, water quality problems related to dissolved oxygen and temperature, and increased sedimentation.

Tidegate and floodgate repair or replacement should be a beneficial action for fish. Older gates tend to be heavier, requiring more force to open. New gates are made of lighter material (typically aluminum) and are hinged at the top. They open at lower flows, allowing for more movement of fish, and greater exchange of water upstream and downstream of the gate. Construction timed with extreme low tides should allow for installation with minimal impacts to the resource. Care should be taken to achieve finished slopes of <1% to provide for fish passage.

1.5.1.3. Utility Lines

Because this category applies only to directional drilling of the utility line bored underneath the stream bed and to excavation performed in the dry where there is no flowing or standing water, there should not be any potential for direct adverse affects to individuals of the listed fish species.

Federal permitting actions related to utility lines have the potential to disturb riparian and instream habitat in the short- and long-term through excavation and fill, stockpiling of excavated material, and

vegetation removal and modification and utility line-related construction (roads, poles, etc.). These activities may introduce sediment, turbidity, and contaminants into water bodies, alter and/or destabilize the beds and banks of water bodies, and can also reduce shade, large wood (LW) supply, and other characteristics of riparian vegetation which are critical elements of salmonid habitat. In addition, the construction of utility lines has the potential to enable other activities, such as commercial and residential development within flood plains, alteration of the volume or timing of water introduction into or withdrawal from streams, etc. which may affect individuals of the ESA-listed species or their designated critical habitat.

Excavation, stockpiling, vegetation manipulation, and construction within the bed of a water body or in its adjacent riparian area may introduce sediment into the water body or expose sediment which is already present, but below the surface of the bed. For example, the excavation of a stream bank may introduce material into a stream channel directly, as may the stockpiling of material from the stream bank within the stream channel. Excavation of the stream bank and the riparian zone, stockpiling of material within the riparian zone, as well as the removal of vegetation on the stream bank and riparian zone may facilitate the transport of sediment into the stream channel by precipitation run-off and/or by high stream flows. The manipulation of LW in riparian areas may also affect sediment input to streams, while disturbance or removal of LW in stream channels may mobilize previously stable accumulations of sediment, or may increase bank erosion. Further, roads associated with utility lines have the potential to transmit sediment to water bodies from a substantial distance from the riparian zone through runoff on the road prism or in ditch lines for an indefinite period. Sediment has the potential to degrade salmonid spawning and incubation habitat, and fine redeposited sediments have the potential to adversely affect primary and secondary productivity (Spence *et al*. 1996), and to reduce cover for juvenile salmonids (Bjornn and Reiser 1991).

Fine sediment introduced into water bodies can cause turbidity. Sediment already within the channel or bed of a water body that is disturbed by excavation, etc. may be more likely to mobilize into the water column thereby creating turbidity. At moderate levels, turbidity has the potential to adversely affect primary and secondary productivity, and at high levels, has the potential to injure and kill adult and juvenile fish, and may also interfere with feeding (Spence *et al*. 1996).

Operation of the back-hoes, excavators, drilling rigs, and other equipment requires the use of fuel, lubricants, etc., which, if spilled into the bed or channel of a water body or into the adjacent riparian zone of a water body during construction associated with utility lines, could injure or kill aquatic organisms. Herbicides used to clear vegetation from and maintain utility rights-of-way may be deliberately used in riparian areas, where they may enter water bodies. The use of roads constructed for maintenance of utility lines also has the potential to indefinitely transmit contaminants to waterbodies, if a hydrologic connection (e.g. ditch) or a ford exists. Petroleum-based contaminants (such as fuel, oil, and some hydraulic fluids) contain polycyclic aromatic hydrocarbons (PAHs) which can cause acute toxicity to salmonids at high levels of exposure and can also cause chronic lethal as well as acute and chronic sublethal effects to aquatic organisms (Neff 1985). Similarly, exposure to herbicides can have lethal and sublethal effects on salmonids, aquatic invertebrates, aquatic vegetation, as well as target and non-target riparian vegetation (Spence *et al*. 1996).

Excavation, stockpiling, vegetation manipulation, and construction within the channel or bed of a water body or in its adjacent riparian area have the potential to change the bottom characteristics (e.g., the substrate or gradient) of the water body and/or to destabilize the banks of water bodies. For example, depending on the substrate composition and the fill type and procedure, the excavation and subsequent filling of a trench in the dry channel or bank of a stream may make the area of the trench more or less resistant to erosion. If the trench area is less resistant to erosion (through loosening of the substrate or through the use of fill with smaller substrate particles than were originally present), then high stream flows may have the potential to erode the disturbed substrate, possibly mobilizing sediment or abruptly altering the bottom contours or bank stability of the stream. If the trench area is more resistant to erosion (through compaction of the substrate or through the use of fill with larger substrate particles than were originally present) then high stream flows may have less of a potential to erode the disturbed substrate than the remainder of the stream bed or bank, possibly creating hydraulic control points which could alter fluvial geomorphological processes. Stockpiled excavated material, if not removed from stream beds or banks, could also affect stream morphology, as could vegetation and LW manipulation which destabilizes stream beds and banks. Finally, pipelines, cables, and materials used to armor them may, if exposed by stream bed or bank erosion, create hydraulic control points or otherwise affect stream channel stability.

The modification of bank and substrate stability caused by the construction of utility lines through water bodies and riparian area can have adverse effects on salmonids because of increased sedimentation (discussed above) and because of potential effects on riparian vegetation (discussed below). Aside from effects on sedimentation and vegetation, bank and substrate stability influence structural elements of instream habitat such as pool depth, channel roughness, and bank slope. Because these structural habitat elements are related to key factors in the distribution of water velocity and the amount of overhead cover, changes in the type and structure of substrate and banks can affect predation risk, energy expenditure, invertebrate production, and feeding efficiency. A particularly adverse potential effect of utility line crossings is their potential to produce hydraulic jumps if a stream channel degrades while the utility line and/or its armoring remains at a fixed elevation. Such a hydraulic jump can impede upstream passage by fish (particularly juvenile salmonids) and other organisms and may have substantial influence on fish abundance well upstream of the project site.

The manipulation of vegetation and LW associated with excavation, stockpiling, and construction in riparian areas and in stream channels can change the characteristics of the riparian areas in both the short- and long-term in ways which would tend to adversely affect fish. Short-term effects on vegetation include the outright destruction or removal of vegetation and LW, as well as lesser disturbance such as trampling; shallow or temporary burial by stockpiled material; temporary displacement of LW; and trimming, mowing, and scraping of vegetation. Long-term effects include permanent, or near-permanent, displacement of habitat for vegetation through paving, armoring, or maintenance of utility corridors. Such long-term effects on vegetation would also tend to cause a long-term reduction in riparian and instream LW.

Vegetation in riparian areas provides soil stability, shade, LW supply, and food for fish and their prey. In addition, riparian vegetation and LW can provide low velocity shelter habitat for fish during periods

of flooding, while instream LW provides similar habitat at all flow levels, as well as shelter from predators, habitat for prey species, and the sediment storage and channel stability attributes described above (Spence *et al*. 1996).

The discussion above covers the likely direct effects of the permitting of the construction of utility lines on salmonids, including the maintenance of the utility lines. In addition to these direct effects, the Federal permitting of the construction of utility lines can sometimes enable other actions to occur; that is, the COE permit would sometimes result in actions that would otherwise not occur. An example of a possible effect of a proposed COE permitted action is the reduction in streamflow that might be associated with the withdrawal of water from a stream or other water body (for direct municipal or industrial use or to form a solution or slurry for the transportation of another substance), if a pipeline is necessary to carry this water over, through, or under a jurisdictional water body. Other examples include: The reduction in streamflows resulting from the use of wastewater treatment plant effluent as irrigation water that is enabled by COE through Section 10, or 404 permitting of the construction of a pipeline for transport of the effluent; the effects on hydrology of a road and maintenance corridor constructed or maintained to service a pipeline or cable that should not be built without a COE permit.

The general and specific conditions that would be placed on actions in this programmatic category should substantially reduce or entirely eliminate adverse effects to ESA listed salmonids and their critical habitat. For example, the construction of utility lines in the dry, or through the use of directional drilling should eliminate the potential for direct adverse effect on individual fish. This requirement would also substantially reduce the potential for adverse short-term effects on water quality. The specific and general conditions that require the permittee to restore the beds and banks of water bodies to pre-project conditions (including contours, topsoil presence, and vegetation) should minimize the likelihood of long-term damage to instream and riparian habitat, as would the erosion control conditions. Finally, the requirement that the applicant must show documentation that the utility line would not become exposed or otherwise inhibit fish passage should eliminate concern that the creation of an hydraulic control point would be enabled through COE's permitting.

1.5.1.5. Road Construction, Repairs and Improvements

Direct and indirect affects to salmonids are likely during road, bridge, and culvert maintenance and construction. Earth-disturbing activities, including excavation, stockpiling, vegetation manipulation and construction, can result in increased delivery of sediment to streams, and increase turbidity in the water column. The severity of the impact depends on numerous factors including the proximity of the action to the water, amount of ground-disturbing activity, slope, amount of vegetation removed, and weather. Sediment introduced into streams degrades spawning and incubation habitat, and can negatively affect primary and secondary productivity. This may disrupt feeding and territorial behavior through short-term exposure to turbid water.

Construction of bridges and roads near water bodies increases the risk that toxic or harmful substances fall or drain into streams and rivers. The potential for wet concrete to accidentally fall into the water and untreated water used to cure concrete draining into streams increases during activity adjacent to water

bodies. Wet concrete (and water used to cure concrete) alters the pH of the water, creating an acutely toxic situation for fish. Project activities may also result in a spill of hazardous materials, including fuel, oil and grease. These can be acutely toxic to fish at high levels of exposure, and cause acute and chronic lethal or sublethal effects to salmonids, aquatic invertebrates, and aquatic and riparian vegetation.

Increases in impervious surface affect the water quality and water quantity/timing in downstream water bodies. The impervious surfaces collects oils and greases and delivers it to wetlands and streams. The channelization of the water results in altered flow rates, increasing peak flows and reducing the low summer flows. This results in incised, straighter streams with lower complexity (see sections on erosion control and water control).

The placement of riprap around bridge piers and abutments will displace natural riverbed substrate, and potentially remove existing riparian habitat. The placement of the excavated riverbed materials on top of the riprap will help ameliorate the impact. Construction activities in riparian areas has the potential to degrade the function of the existing riparian habitat by removing vegetation and de-stabilizing stream banks. Potential impacts include the loss of LW and LW recruitment, loss of riparian shade and cover, loss of habitat complexity and decreased floodplain interactions.

Direct impacts to listed fish from culvert placement, repair or cleaning are not expected because these activities will occur when the stream is dry or when listed fish are usually not present in the project reach. There may be juvenile fish rearing in the area, but they are likely to avoid the activity. Loss of spawning habitat is expected to be minimal. Equipment will work from the top of the bank, minimizing damage to riparian areas. Inadequately placed culverts may result in blocked fish passage or scouring downstream of the culvert.

1.5.1.6. Site Preparation for Construction of Buildings and Related Features

The loss of estuarine and riverine wetlands can adversely affect all salmon species. Those species most likely to be affected are coho, which use riverine wetlands and estuaries for over-wintering, and chum, chinook, and sea-run cutthroat, which rear in estuaries for extended periods (National Research Council 1996). Wetlands may also regulate stream flow, and often provide key habitat for beavers (that in turn may provide instream habitat benefits for salmonids from their placement of wood in streams) (Oregon Coastal Salmon Restoration Initiative 1997). In parts of Oregon, such as along the Willamette River, large expanses of wetlands and riparian forests have been lost to development (Sedell and Froggatt 1984). Other wetlands have been isolated from their associated streams by roads or other improvements. Diking, draining and filling are the most common activities that have reduced the abundance and quality of wetlands (Oregon Coastal Salmon Restoration Initiative 1997). Wetlands that have been filled, disconnected from streams or otherwise altered result in decreased rearing and overwintering habitat, stormwater storage, and water filtration (Oregon Coastal Salmon Restoration Initiative 1997).

Specific information about the effects of the proposed action on wetlands and streams is contained in the biological assessment. Additional effects not described in the BA include:

1. To the discussion of hydrology and sediments effects in the BA, NMFS adds that filling and grading can cause wetland areas to become isolated from streams, thereby decreasing their contribution to stream productivity. Also, not only are spawning areas destroyed by high fine sediment loads (as the BA explains), but rearing habitat also is reduced as pools and interstitial rearing spaces are filled by sediment.

2. To the discussion of water quality and riparian functions, NMFS adds that other functions of riparian vegetation that can be lost due to site preparation activities include: providing bank stability through root reinforcement; providing shade that moderates water temperature; providing organic material inputs (e.g. leaf litter) that serve as energy sources for stream organisms; and acting as a source of terrestrial organisms that "fall" into the water and are preyed upon by fish.

3. NMFS also is concerned about cumulative impacts accruing from multiple site-preparation activities in a given watershed. According to the U.S. Council of Environmental Quality's regulations implementing the procedural provisions of the National Environmental Policy Act, a "cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. For projects authorized by the COE, these effects can be offset with compensatory mitigation.

1.5.1.7. Stream and Wetland Restoration and Enhancement

Stream and wetland habitat restoration and enhancement can vary in size and scope and can include a range of activities from major modification of the landscape and control of water regimes to minor changes to physical features or biological communities. The effects of these actives on conditions that support listed fish will vary. Simply stated, large projects will impact a larger geographic area, and complex projects will have more variables and uncertain results. NMFS recognizes that restoration actions may be appropriate and necessary, particularly where there has been substantial habitat degradation for long periods of time. NMFS does not object to these projects, but would expect that a greater level of effort would be required to plan these project and evaluate the details.

Stream and wetland restoration and enhancement will require some modification of physical and biological characteristics at the project site. The NMFS recognizes the importance of stream and wetland restoration and enhancement as a means to protect and recover listed fish and considers projects as described in this Opinion will likely result in improvement to PFC. Yet, implementing restoration and enhancement actions can be complicated and require substantial expertise and skill.

Restoration and enhancement activities, although expected to result in a beneficial outcome, can lead to short-term or long-term adverse effects to listed fish.

In the short-term, in-water work associated with restoration activities could result in the disturbance of salmonids through turbidity, noise, contact (or near-contact) with equipment, compaction and disturbance of instream gravel from heavy equipment, and modification to adjacent riparian areas. Juvenile fish that may be rearing in the vicinity of the action area would most likely be displaced, although working during the in-water work period may lessen or preclude fish presence.

Suspended sediment and turbidity influences on fish reported in the literature range from beneficial to detrimental. Elevated total suspended solids (TSS) conditions have been reported to enhance cover conditions, reduce piscivorous fish/bird predation rates, and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental effects of TSS on fish are the frequency and the duration of the exposure (not just the TSS concentration).

Behavioral avoidance of turbid waters may be one of the most important effects of suspended sediments (DeVore *et al*. 1980, Birtwell *et al*. 1984, Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (McLeay *et al*. 1984, 1987, Sigler *et al*. 1984, Lloyd 1987, Scannell 1988, Servizi and Martens 1991). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, except when the fish need to traverse these streams along migration routes (Lloyd *et al*. 1987). In addition, a potentially positive reported effect is providing refuge and cover from predation (Gregory and Levings 1988).

Fish that remain in turbid, or elevated TSS, waters experience a reduction in predation from piscivorous fish and birds (Gregory and Levings 1998). In systems with intense predation pressure, this provides a beneficial trade-off (e.g., enhanced survival) to the cost of potential physical effects (e.g., reduced growth). Turbidity levels of about 23 Nephalometric Turbidity Units (NTU) have been found to minimize bird and fish predation risks (Gregory 1993). Exposure duration is a critical determinant of the occurrence and magnitude of physical or behavioral effects (Newcombe and MacDonald 1991). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such high pulse exposures. Adult and larger juvenile salmonids appear to be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjorn and Reiser 1991). However, research indicates that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Redding et al. 1987, Lloyd 1987, Servizi and Martens 1991).

Turbidity, at moderate levels, has the potential to adversely affect primary and secondary productivity, and at high levels, has the potential to injure and kill adult and juvenile fish, and may also interfere with feeding (Spence *et al*. 1996). Newly emerged salmonid fry may be vulnerable to even moderate amounts of turbidity (Bjornn and Reiser 1991). Other behavioral effects on fish, such as gill flaring and

feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985). Fine redeposited sediments also have the potential to adversely affect primary and secondary productivity (Spence *et al.* 1996), and to reduce incubation success (Bell 1991) and cover for juvenile salmonids (Bjornn and Reiser 1991). There is a low probability of direct mortality, because the turbidity should be localized and brief, and because the fish should be aware and agile enough to avoid any equipment used to place logs and boulders.

Instream use of heavy equipment may compact and disturb stream bed gravels. Compaction and disturbance of stream bed gravels may increase difficulty in redd excavation and the ability of the gravels to be aerated, resulting in lost productivity. Cederholm et al. (1997) recommend that heavy equipment work should be performed from the bank and that work within bedrock or boulder/cobble bedded channels should be viewed as a last resort and that least impacting equipment such as spider harvesters/log loaders be utilized.

Short-term alterations to the adjacent riparian area to facilitate access to the stream may result in increases in turbidity and loss of vegetation. The loss of vegetation may result in some small amount of increased solar radiation and subsequent small increase in stream temperature. These effects can be offset with compensatory mitigation.

In the longterm, there is the potential to have a deleterious effect on a stream system if the project is not well planned, designed and implemented properly. Projects that are not well planned may fail with subsequent impacts to stream channels and banks. Cederholm et al. (1997) state that although there have been hundreds to thousands of restoration projects undertaken in the Pacific Northwest, their effectiveness is not well documented. Slaney and Martin (1997) state that "project evaluation is essential to improve our effectiveness." Restoration projects often concentrate on instream habitat without addressing the processes that led to the loss of the habitat (Roper *et al.* 1997). House (1996) recommends that a limiting factors be identified and watershed plans be completed before undertaking restoration projects. Reeves et al. (1991) indicate that stream hydraulics, hydrology and geomorphology are important and must be carefully evaluated before any instream work is started, and that care must be taken to identify aspects of habitat that limit production. Roper et al. (1997) recommend that professionals from numerous disciplines such as range ecology, silviculture, ecology, engineering and geology be part of the planning process for restoration projects. Carlson et al. (1990) also stressed the importance of considering all aspects of a watershed for its potential capacity for fish production. Kershner et al. (1991) state that to manage a stream as a viable place for fish, an understanding of the dynamics of the watershed and the resultant effects on the stream is required.

In addition, monitoring of the effectiveness of a stream rehabilitation project is important and "any habitat manipulation proposal should specify procedures for pre- and post-construction studies so resulting physical and biological changes can be evaluated" (Reeves *et al.* 1991). Roper et al. (1997) state that only through monitoring can specific restoration activities be evaluated as to their effect in overall watershed restoration.

For the above reasons, this Opinion does not apply to stream and wetland restoration and enhancement actions. While the desire to actively restore estuarine habitat is understandable, the process is a difficult one. The success of a restoration project is not readily predictable and the benefits are hard to quantify (Fox 1992, Zedler 1996, Simenstad and Thom 1996). Our ability to re-create a "natural" portion of an estuary is limited. Current ecological understanding does not allow easy prediction of how a site will perform (Zedler 1996). Simenstad and Thom (1996), reporting on the success of a created estuarine wetland in the Puget Sound region, found that sedimentation altered the hydrology of the constructed site - changing the planted vegetation to a more naturally occurring plant community. Thus, though the site is not functioning as envisioned, it is functioning in a productive manner.

Mitsch and Wilson (1996) propose that wetlands restoration projects fail when three general concepts are ignored: understanding wetland function, giving the system time, and allowing for the self-design capacity of nature. Fox (1992) suggests that restoration projects are individual in nature and usually require tailored and innovative design approaches if they are to have any chance of success. In addition, the involved parties often disagree on how to conduct the restoration (National Research Council 1996). Designed wetlands are expensive to construct and they may not succeed (Mitsch and Wilson 1996). For this reason, only passive forms of estuarine restoration are covered under this consultation.

Passive restoration requires only that the anthropogenic disturbance be removed from the system (National Research Council 1996, Kauffman et al. 1997). The intent of this form of restoration is to allow natural physical, chemical, and biological processes to restore the system to a level dictated by its local capability (National Research Council 1996). Activities should emphasize ecological processes and functions, not artificial habitat creation (National Research Council 1996). Because estuarine areas are dynamic, trying to restore areas to a "natural" pre-existing condition may be an improper response to the current conditions of the estuary, and it may curtail or prohibit actual restoration (Winfield 1986). Passive restoration will require a substantial amount of time to recruit plants, establish organic sedimentation levels, and allow the site to function as salmonid habitat. As Mitsch and Wilson (1996) state: "Nature remains the chief agent of both self-design and ecosystem development; humans are not the only participants in the design process."

Like restoration of other types of salmonid habitat, estuarine restoration requires a watershed approach that takes into account hydrologic and hydraulic regimes. Such an approach can determine the factors limiting salmonid production within the watershed and show where best to improve salmonid habitat (Kauffman et al. 1997, Roper et al. 1997, Nelson 1997). Rumrill and Cornu (1995) recommend that "restoration projects should not be planned and undertaken piecemeal, but within the broader context" and that "experimental efforts to restore upland, riparian and wetland habitats are undertaken in the context of the entire coastal watershed landscape." After restoration, it is necessary to monitor the site to determine if the restoration project goals and objectives are being met (Winfield 1986, Ray and Woodroof 1986).

Breaching or removing dikes is a common practice along the West Coast (Frenkel and Morlan 1991). It is also among the easiest of estuarine restoration methods. Once a dike is breached - allowing tidal

exchange - native plants will begin to invade and colonize. This method will require a substantial amount of time to fully develop, but it should have a high rate of success. Maintaining a wetland area through time requires a hydrologic interaction with the landscape (Bedford 1996). Potential problems may arise if the breach is not properly designed to allow tidal exchange, or site elevations cause ponding (Ray and Woodroof 1986). Surface elevation controls the hydrology of the site and thusly the plant community (Frenkel and Morlan 1991). Areas that have been previously diked off may have experienced subsidence or soil compaction. These areas need further evaluation of their ability to naturally revert to wetlands without human intervention. Good (1987) recommended that careful consideration be given to the site's energy regime and that site manipulation be minimized. Caution must also be exercised to protect freshwater habitats from saltwater intrusion. In addition, adjacent upland areas that may have been modified by human activities buffer restoration sites and should therefore also be considered in planning (Good 1987, Steinke 1986, Zedler 1996). Adjacent upland areas also allow organic material (leaves and large woody debris) to be introduced to the project site, and provide habitat for birds, reptiles, amphibians, and mammals that use estuarine marshes.

A second method for restoring estuaries is to remove existing fill material and allow natural recolonization to take place. Areas of an estuary that have been filled should readily transform back to a more "natural" state. As with dike breaching, the area should be allowed to recolonize through natural recruitment. Proper site hydrology is critical for establishing native vegetation in these removal areas (Ray and Woodroof 1986, Pacific Estuarine Research Laboratory 1990).

A final method would involve removing or permanently opening tide gates. This would create a salt marsh usable by outmigrating salmonids and estuarine-dependent species without the chance of entrapping them behind the gates. For this method to succeed, tidal flows must provide adequate water exchange and thus prevent fish stranding.

Considerations relevant to the development of any estuarine restoration project include:

1. How will the estuarine restoration project fit in with other restoration projects within the watershed? Is this project part of a watershed approach to restoration? Are there other projects that would have a more direct benefit to improving salmonids that should be completed before estuarine restoration?

2. Have hydrologic and hydraulic regimes been addressed? Will there be adequate water exchange to prevent stranding? Will there be full tidal connection?

3. Has the site been evaluated for subsidence or soil compaction? Has the soil salinity been tested?

4. Have adjacent upland areas been included in the site?

5. Has a monitoring plan been developed?

6. Has a survey of plant communities within the estuary been completed? Are there sufficient sources of plants to allow for natural recolonization?

1.5.1.8. Boat Ramps

The mainstem portions of rivers in Oregon serve as an important migration route for numerous species of anadromous fish, whether they key on shallow, nearshore habitats like fall chinook or mid-river like sockeye salmon and steelhead juveniles (Dawley et al. 1986). The addition of boat ramps and their accompanying in-water structures and upland facilities may affect anadromous fish through creation of predatory fish habitat or changes in water quality from run-off.

Juvenile salmonid species such as spring chinook, sockeye, and coho salmon and up-river steelhead usually move downriver relatively quickly and in the main channel. This would aid in predator avoidance (Gray and Rondorf 1986). Fall and summer chinook salmon are found in nearshore, littoral habitats and are particularly vulnerable to predation (Gray and Rondorf 1986). Juvenile salmonids (chinook and coho salmon, and cutthroat trout) utilize backwater areas during their outmigration (Parente and Smith 1981). In addition, the presence of predators may force smaller prey fish species into less desirable habitats, disrupting foraging behavior, resulting in less growth (Dunsmoor et al. 1991).

When a salmon stock suffers from low abundance, predation can contribute significantly to its extinction (Larkin 1979). Further, providing temporary respite from predation may contribute to increasing Pacific salmon (Larkin 1979). A substantial reduction in predators will generally result in an increase in prey (in this case, salmonids) abundance (Campbell 1979). Gray and Rondorf (1986), in evaluating predation in the Columbia River Basin, state that "The most effective management program may be to reduce the susceptibility of juvenile salmonids to predation by providing maximum protection during their downstream migration." Campbell (1979), discussing management of large rivers and predator-prey relations, advocates that a "do nothing" approach (as opposed to predator manipulations) coupled with a strong habitat protectionist policy, should receive serious consideration.

Predator species such as northern pikeminnow (*Ptychocheilus oregonensis*), and introduced predators such as largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), black crappie (*Pomoxis nigromaculatus*) white crappie (*P. annularis*) and, potentially, walleye (*Stizostedion vitreum*) (Ward et al. 1994, Poe et al. 1991, Beamesderfer and Rieman 1991, Rieman and Beamesderfer 1991, Petersen et al. 1990, Pflug and Pauley 1984, and Collis et al. 1995) may utilize habitat created by over-water structures (Ward and Nigro 1992, Pflug and Pauley 1984) such as piers, float houses, floats and docks (Phillips 1990). However, the extent of increase in predation on salmonids in the lower Columbia River resulting from over-water structures is not well known.

Major habitat types utilized by largemouth bass include vegetated areas, open water and areas with cover such as docks and submerged trees (Mesing and Wicker 1986). During the summer, bass prefer pilings, rock formations, areas beneath moored boats, and alongside docks. Colle et al. (1989) found

that, in lakes lacking vegetation, largemouth bass distinctly preferred habitat associated with piers, a situation analogous to the Columbia River. Marinas also provide wintering habitat for largemouth bass out of mainstem current velocities (Raibley et al. 1997). Bevelhimer (1996), in studies on smallmouth bass, indicates that ambush cover and low light intensities create a predation advantage for predators and can also increase foraging efficiency. Wanjala et al. (1986) found that adult largemouth bass (*Micropterus salmoides*) in a lake were generally found near submerged structures suitable for ambush feeding. The slower currents found in Canoe Bay make this area conducive to largemouth bass.

Black crappie and white crappie are known to prey on juvenile salmonids (Ward et al. 1991). Ward et al. (1991), in their studies of crappies within the Willamette River, found that the highest density of crappies at their sampling sites occurred at a wharf supported by closely spaced pilings. They further indicated that suitable habitat for crappies includes pilings and riprap areas. Walters et al. (1991) also found that crappie were attracted to in-water structures and recommended placement of structures as attractants in lake environs.

Ward (1992) found that stomachs of northern pikeminnow in developed areas of Portland Harbor contained 30% more salmonids than those in undeveloped areas, although undeveloped areas contained more northern pikeminnow.

There are four major predatory strategies utilized by piscivorous fish: they run down prey; ambush prey; habituate prey to a non-aggressive illusion; or stalk prey (Hobson 1979). Ambush predation is probably the most common strategy: predators lie-in-wait, then dart out at the prey in an explosive rush (Gerking 1994). Predators may use sheltered areas that provide slack water to ambush prey fish in faster currents (Bell 1991).

Light plays an important role in defense from predation. Prey species are better able to see predators under high light intensity, thus providing the prey species with an advantage (Hobson 1979, Helfman 1981). Petersen and Gadomski (1994) found that predator success was higher at lower light intensities. Prey fish lose their ability to school at low light intensities, making them vulnerable to predation (Petersen and Gadomski 1994). Howick and O'Brien (1983) found that in high light intensities prey species (bluegill) can locate largemouth bass before they are seen by the bass. However, in low light intensities, the bass can locate the prey before they are seen. Walters et al. (1991) indicate that high light intensities may result in increased use of shade-producing structures. Helfman (1981) found that shade, in conjunction with water clarity, sunlight and vision, is a factor in attraction of temperate lake fishes to overhead structure.

An effect of over-water structures is the creation of a light/dark interface that allows ambush predators to remain in a darkened area (barely visible to prey) and watch for prey to swim by against a bright background (high visibility). Prey species moving around the structure are unable to see predators in the dark area under the structure and are more susceptible to predation.
The incorporation of grating into all of the docks allows for more light penetration and diffuses the light/dark interface. This will minimize the susceptibility of juvenile salmonids to piscivorous predation resulting from these types of projects.

In addition to piscivorous predation, in-water structures (tops of pilings) also provide perching platforms for avian predators such as double-crested cormorants (*Phalacrocorax auritis*), from which they can launch feeding forays or dry plumage. Their high energy demands associated with flying and swimming create a need for voracious predation on live prey (Ainley 1984). Cormorants are underwater pursuit swimmers (Harrison 1983) that typically feed on mid-water schooling fish (Ainley 1984), but they are known to be highly opportunistic feeders (Derby and Lovvorn 1997; Blackwell et al. 1997; Duffy 1995. Double-crested cormorants are known to fish cooperatively in shallow water areas, herding fish before them (Ainley 1984). Krohn et al. (1995) indicate that cormorants can reduce fish populations in forage areas, thus possibly affecting adult returns as a result of smolt consumption. Because their plumage becomes wet when diving, cormorants spend considerable time drying out feathers (Harrison 1983) on pilings and other structures near feeding grounds (Harrison 1984). Placement of piles to support the dock structures will potentially provide for some usage by cormorants. Placement of anti-perching devices on the top of the pilings would preclude their use by any potential avian predators.

The placement of a boat ramp will generally result in permanent loss of some riparian habitat. The extent of area of that loss associated with a ramp is usually small. Upland parking lots, picnic areas, walking trails and toilet facilities will also result in losses to critical habitat if placed close to the waters edge. In addition, construction activities associated with ramp construction will also result in impacts to the riparian area. These effects can be offset with compensatory mitigation.

Riparian habitats are one of the most ecologically productive and diverse terrestrial environments (Kondolf et al. 1996, Naiman et al. 1993). Vegetation in riparian areas influences channel processes through stabilizing bank lines, and providing LW, terrestrial food sources rather than autochthonous food production, and regulating light and temperature regimes (Kondolf et al. 1996, Naiman et al. 1993). Revegetation of any riparian areas disturbed by construction activities in time will maintain or improve habitat conditions for salmonids within the action area by potentially increasing plant densities in degraded areas or changing plant species at the site to those that are more beneficial to aquatic species.

Boat ramps and associated structures in estuarine environments also may impact anadromous fish. Estuaries are the bays and inlets influenced by both the ocean and a river and serve as the transitional zone between fresh and salt water (Botkin et al. 1995). Estuaries support a community of plants and animals that are adapted to the zone where fresh and salt waters mix (Zedler et al. 1992). Estuaries are naturally dynamic and complex. Human actions alter estuaries by stabilizing and simplifying this complexity (Williams et al. 1996).

Habitat degradation and loss adversely affect inshore and riverine ecosystems critical to living marine resources (Chambers 1992). Furthermore, degradation and loss of estuarine habitat reduce salmon carrying capacity in these areas. The cumulative effects of small changes in many estuaries may have a large systematic impact on estuarine and coastal oceanic carrying capacity (Monaco et al. 1990).

Fox (1992) states: "The ability of habitats to support high productivity levels of marine resources is diminishing, while pressures for their conversion to other uses are continuing." Point and non-point discharges, waste dumps, eutrophication, acid rain, and other human impacts reduce this ability (Fox 1992). Population growth and demands for international business trade along the Pacific Rim exert pressure to expand coastal towns and port facilities - resulting in net estuary losses (Kagan 1991, Fawcett and Marcus 1991). Carefoot (1977), discussing Pacific seashores, states: "Estuaries are complex systems which can succumb to humankind's massive and pervasive assaults."

Estuarine habitats fulfill fish and wildlife needs for reproduction, feeding, refuge, and other physiological necessities (Simenstad et al. 1991, Good 1987, Phillips 1984). Coastal fish populations depend upon both the quantity and quality of the available habitat (Peters and Cross 1992). Almost all marine and intertidal waters, wetlands, swamps and marshes are critical to fish (Fedler and Crookshank 1992). For example, seagrass beds protect young fish from predators, provide habitat for fish and wildlife, improve water quality, and control sediments (Lockwood 1990, Thayer et al. 1984, Hoss and Thayer 1993, Phillips 1984). In addition, seagrass beds are critical to nearshore food web dynamics (Wyllie-Echeverria and Phillips 1994). For example, some invertebrates that are principal prey items for fish of commercial and ecological importance (e.g. chum salmon, Pacific herring and Pacific sand lance) in the Pacific Northwest are found only in eelgrass beds (Simenstad et al. 1982, Simenstad 1994).

Seagrass beds are among the areas of highest primary productivity in the world (Ferguson et al. 1980, Emmett et al. 1991, Hoss and Thayer 1993, Herke and Rogers 1993). This primary production, combined with other nutrients, provide high rates of secondary production in the form of fish (Good 1987, Sogard and Able 1991, Emmett et al. 1991, Herke and Rogers 1993). Filling, dredging, and construction of in-water structures can damage seagrass beds through burying, removal, or shading (Thayer et al. 1984, Lockwood 1990, Burdick and Short 1998, Fonseca et al. 1998). Also, boat operation above or within seagrass beds can damage the beds through vessel wakes, and propeller washing (Peterson et al. 1987, Lockwood 1990, Fonseca et al. 1998). Deep, long-term scarring results when propellers churn through the substrate, severing rhizomes (Zieman 1976, Fonseca 1989). Methodologies to reduce effects of docks and other structures on seagrass beds are provided in Lockwood (1990), Burdick and Short (1998), and Fonseca et al. (1998).

Salmon have evolved several life-history strategies for using estuaries (Williams et al. 1996). Five anadromous fish species (pink, chum, coho, and chinook salmon and sea-run cutthroat trout) are found in association with eelgrass meadows (Phillips 1984). Coho, yearling chinook, and sockeye salmon spend little time in the estuary; pink salmon traverse through the estuary relatively quickly; and chum and subyearling chinook salmon use the estuary quite extensively (Pearcy 1992, Fisher and Pearcy 1996). Pearcy (1992) indicates that chum salmon in Netarts Bay, Oregon make extensive use of shallow marshes, sloughs, and tidal creeks in the upper reaches during high tides in the spring. During low tides they move into deep water channels. As the fish grew in size, they began to use the lower portions of the estuary.

The exact times when juvenile salmonids enter the estuary and how long they stay depend upon numerous abiotic and biotic factors such as stream temperatures, fry size and condition, food resources,

stream discharge and turbidity, tidal cycles, and photoperiod (Simenstad et al. 1982). Simenstad et al. (1997), in their monitoring studies of an "engineered" slough, found that coho salmon use these areas as rearing habitat. In addition, sea-run cutthroat trout also spend substantial periods in the estuary (Giger 1972). Palmisano (1997), discussing factors for the decline of Umpqua River cutthroat trout, states that sea-run cutthroat make extensive use of estuaries, embayments, and sheltered shorelines, with some cutthroat residing in an estuary for as long as 18 months. The National Research Council (1996) states, "loss of estuarine and riverine habitat can potentially affect all salmon."

Estuaries serve as rearing grounds and food sources and provide a transitional area for salmonids moving from fresh to salt water and vice-versa (Botkin et al 1995). Estuaries also play a key role in regulating overall survival and abundance (Williams et al. 1996). Changes in estuarine food webs may constrain salmon production (Williams et al. 1996). Botkin et al. (1995) stated: "Without the rich supporting wetland areas highly valuable to most if not all salmon species, the crucial transition of salmon smolts to oceanic life would be jeopardized."

Installation of boat ramps and other associated in-water structures may result in loss of eel-grass beds or other aquatic vegetation. Water quality degradation from upland associated activities may also result in losses or degradation of habitat. Avoiding placement of boat ramps and accompanying in-water structures in areas with aquatic vegetation and treating waste water from upland facilities will minimize impacts associated with these structures.

1.5.1.9. Other Minor Discharges and Excavations

The general and specific conditions associated with the programmatic category (particularly the requirements that heavy equipment not operate within the stream channel, that no stream diversion occur, and that concrete be placed within sealed forms) are likely to substantially minimize the likelihood of direct injury to individual fish. The conditions would not rule out such injury altogether, though, because fish in the vicinity of the dredge/fill work area would still have some potential to come into contact with the bucket of the equipment or with rock or other material that is excavated, moved, or placed. Even without direct contact, the shadows, noise, and vibrations produced by such activities would likely disturb nearby fish, although such disturbance would likely not have long-term adverse effects. Harm to fish during the proposed permitted activities is more than negligibly likely, but would likely be rare because the disturbance associated with construction activities would likely cause aware and agile salmonids to vacate and/or avoid the area while such disturbance is occurring. No immobile forms of the listed species should be affected by these activities. Salmonid spawning and incubation habitat is specifically exclude from programmatic coverage. Compliance with the ODFW in-water work windows should also ensure that effects are not transmitted to such habitat.

Sediment in the water bodies affected by this category of programmatic activities will be mobilized (*i.e.*, transformed into turbidity) by the proposed action. At moderate levels, turbidity has the potential to adversely affect primary and secondary productivity, and at high levels, has the potential to injure and kill adult and juvenile fish, and may also interfere with feeding (Spence *et al*. 1996). Although turbidity has some potential to directly adversely affect fish, this usually occurs in situations where no relief from

the turbidity is possible. Salmonids in proximity of the proposed activities should have the opportunity and mobility to avoid (laterally or upstream from) what should be minor and short-term turbidity plumes created by the proposed actions. As noted above, eggs and pre-emergent fry should not be affected by programmatic actions.

The operation of heavy equipment, generators, etc. associated with the programmatic actions may require the use of fuel and lubricants which, if spilled into, could injure or kill aquatic organisms. Spills of these materials into the floodplain may also result in delayed transmittal to the stream, resulting in injury or mortality of aquatic organisms. While green concrete may also be used under this programmatic category, and can be acutely toxic if not properly contained, cured, and neutralized, the conditions applied to the activities should prevent introduction of this substance into the wetted channel.

1.5.1.10. Installation and Repair of Navigational Aids

Activities associated with this category may have impacts similar to those described in the Boat Ramp section above. Cormorant usage of these structures for loafing, nesting and fishing is quite high in the Columbia River estuary (Roby *et al.* 1998 and Collis *et al.* 1999). Collis et al. (1999) found that 53% of the prey items of cormorants nesting on, or near Rice Island were juvenile salmonids.

1.5.1.11. Maintenance of Existing Structures and Marinas

Activities associated with this category may have impacts similar to those described in the Boat Ramp section for in-water structures above.

1.5.1.12. Installation of Small Temporary Floats

Activities associated with this category may have impacts similar to those described in the Boat Ramps section for in-water structures. Predatory fish species take some time to find and utilize new habitats associated with in-water structures. Since these structures are temporary in nature, the structures may be removed before predatory species can locate them. However, the longer the structures are in place, the higher the potential for usage. The proposed conditions should minimize any impacts.

1.5.1.13. Structures in Fleeting and Anchorage Areas

Activities associated with this category are not expected to have a deleterious impact to anadromous fish. Permitted structures are buoys and floats that are of relatively small size and usually located in areas well away from the shoreline in deeper waters. Predatory fish species that may concentrate around these structures (see Boat Ramps section above) are not expected in riverine environments due to the faster currents away from the shoreline that would require higher energy requirements by the predators to remain around the structure. The energetic costs of fish maintaining themselves rises with increasing velocity, with optimal sites being those in slower waters (Metcalfe *et al.* 1997). Within the estuarine environment, these structures could act as an attractant to predatory species. However, the amount of predatory species located in estuaries in Oregon that may utilize this habitat are limited.

1.5.1.14. Maintenance Dredging

Dredging and disposal of the dredged material speed up the natural processes of sediment erosion, transportation and deposition (Morton 1977). The physical effects to the river system from dredging and disposal briefly summarized are: temporary increases in turbidity, changes in bottom topography with resultant changes in water circulation, and changes in the mechanical properties of the sediment at the dredge and disposal sites (Morton 1977). The significance of the effect is a function of the ratio of the size of the dredged area to the size of the bottom area and water volume (Morton 1977).

Potential impacts to listed salmonids from the proposed action include both direct and indirect effects. Potential direct effects include entrainment of juvenile fish (Dutta and Sookachoff 1975a, Boyd 1975, Armstrong *et al*. 1982, Tutty 1976) and mortality from exposure to suspended sediments (turbidity). Potential indirect effects include behavioral (Sigler *et al*. 1984, Berg and Northcote 1985, Whitman et al. 1982, Gregory 1988) and sub-lethal impacts from exposure to increased turbidity (Sigler 1988, Sigler *et al*. 1984, Kirn *et al*. 1986, Emmett *et al*. 1988, Servizi 1988); mortality from predatory species that benefit from activities associated with dredged material disposal; mortality resulting from stranding as a result of vessel wakes; modifications to nearshore habitat resulting from erosion as a result of vessel wakes or dredging itself; loss of benthic food sources resulting from dredging and disposal of dredged material (Morton 1977); and cumulative effects of increased industrialization at port facilities located along the river.

The NMFS does not expect clamshell dredging to entrain juvenile salmonids. The action of the bucket passing through the water column should allow for salmonids to avoid it. However, hydraulic suction dredging may entrain juvenile salmonids. When juvenile salmonids come within the "zone of influence" of the cutter head, they may be drawn into the suction pipe (Dutta 1976, Dutta and Sookachoff 1975a). Dutta (1976) reported that salmon fry were entrained by suction dredging in the Fraser River and that suction dredging during juvenile migration should be controlled. Braun (1974a, 1974b), in testing mortality of entrained salmonids, found that 98.8% of entrained juveniles were killed. Dutta and Sookachoff (1975b) indicate that suction dredging operations "cause a partial destruction of the anadromous salmon fishery resource of the Fraser River." Boyd (1975) indicated that suction pipeline dredges operating in the Fraser River during fry migration took substantial numbers of juveniles. As a result of these studies, the Canadian government issued dredging guidelines for the Fraser River to minimize the potential for entrainment (Boyd 1975). Further testing in 1980 by Arseneault (1981) resulted in entrainment of chum and pink salmon but in low numbers relative to the total of salmonids outmigrating (.0001 to .0099%).

However, the Portland District Corps of Engineers conducted extensive sampling within the Columbia River in 1985-88 (Larson and Moehl 1990) and again in 1997 and 1998. In the 1985-88 study no juvenile salmon were entrained and the 1997-98 study resulted in entrainment of only two juvenile salmon. McGraw and Armstrong's (1990) examination of fish entrainment rates in Grays Harbor from 1978 to 1989 resulted in only one juvenile salmon being entrained. Dredging was conducted outside peak migration times. Stickney (1973) also found no evidence of fish mortality while monitoring dredging activities along the Atlantic Intracoastal Waterway.

These studies were on deep water areas associated with main channels. There is little information on the extent of entrainment in shallow water areas, such as those associated with the side channels proposed as part of maintenance dredging. Further information is needed to determine if suction dredging in these shallow water areas may entrain juvenile salmonids.

The effects of turbidity on salmonids is discussed in the section on Stream and Wetland Restoration and Enhancement above.

In areas of coarse sand, NMFS expects the turbidity generated from the dredging process to be very small and confined to the area close to the draghead. Issues involving turbidity associated with flowlane disposal were addressed in the 1993 biological opinion with COE for navigation channel maintenance dredging. NMFS did not believe that mortality resulting from turbidity was an issue of concern during that consultation and has no information that would change that belief for this Opinion.

In areas of fine and medium grained sediments, turbidity and resuspension of toxic sediments may be a problem. The proposed timing and methodology restraints should minimize turbidity issues. However, testing of sediments prior to dredging to limit resuspension of toxic materials is necessary.

1.5.1.15. Return Water From Upland Contained Disposal Areas

Return water from upland contained disposal areas may affect anadromous salmonids in several ways. As the disposal site fills with material, retention time becomes less and suspended material in the waste water increases, resulting in turbidity plumes (O'Neal and Sceva 1971). Effects from increased turbidity are discussed in the Maintenance Dredging section above.

In addition to increased turbidity, discharge water may contain numerous toxics that have been resuspended during dredging operations. As mentioned above, testing of sediments prior to dredging to limit resuspension of toxic materials is necessary.

1.5.1.16. Fish and Wildlife Harvest, Attraction Devices and Activities

The culture of estuarine, marine, and freshwater species in coastal areas can reduce or degrade habitats used by native stocks. The location and operation of these facilities will determine the level of impact on the marine environment.

A major concern of aquaculture operations is the discharge of organic waste from the farms. Wastes are composed primarily of feces and excess feed and the buildup of waste products into the receiving waters will depend on water depths and circulation patterns. The release of these wastes may introduce nutrients or organic materials into the surrounding water body and lead to a high biochemical oxygen demand (BOD) which may reduce dissolved oxygen, thereby potentially affecting the survival of many aquatic organisms in the area. Nutrient overloads at the discharge site can also favor one group of organisms to the detriment of other more desirable prey types such as polychaete worms.

In the case of cage mariculture operations for grow-out operations, impacts to the seafloor below the cages or pens may occur. The composition and diversity of the bottom-dwelling community (e.g, prey organisms) due to the build-up of organic materials on the sea floor may be impacted. Growth of submerged aquatic vegetation, which may provide shelter and nursery habitat for a number of fish species and their prey, may be inhibited by shading effects. Disruption of eelgrass habitat by management activities (e.g. the dumping of shell with spawn on eelgrass beds, damage to eelgrass due to subsequent water or wind shear against the sharp oyster shells, repeated mechanical raking or trampling) associated with this category are also of concern, though few studies have been done to document impact. It is known that hydraulic dredges used to harvest oysters in coastal bays with eel grass habitat can cause long-term disruption of the eelgrass beds, reducing or eliminating the beds, thereby causing impacts to salmon and their prey (Phillips 1984).

The use of pesticides in estuaries to support oyster culture may also impact salmonids. Non-target effects including the mortality of fish and invertebrates is known to occur on treated beds. Mortality of fin fish may occur when fish become trapped in tide pools and are subsequently sprayed. The effect of application on populations present in subtidal channels adjacent to treated oyster beds is unknown as is the effect of fish migrating over treated beds. In studies done on caged English sole on treated oyster beds and in tidal channels adjacent to treated areas, as well as on free-roaming English sole that were captured in a trawl along the perimeter of sprayed beds, depressed brain enzyme (acetylcholinesterase) function occurred at a level which is known to cause behavioral and growth abnormalities in other species. The researchers speculated that levels of impact might be expected to be higher in non-caged fish that would be eating contaminated prey and that fish migrating over a treated bed with the leading edge of the tide would encounter higher carbaryl concentrations than the caged fish (Pozarycki et al. 1997). Oregon has banned the use of carbaryl to prevent shellfish loss to burrowing shrimp (a major prey item for salmonids), thus this is not an issue unless the use of carbaryl is again allowed.

Concern has also been expressed about the potential for extensive shellfish culture in estuaries to influence estuarine food webs to the detriment of salmon. Oyster are efficient filter feeders and can change the trophic structure by removal of the microalgae and zooplankton that are also the food source for salmon prey species. This could potentially be of concern since it is known that in estuarine areas, juvenile salmon can encounter food limitations which can reduce growth and survival and alter migration timing, due to inter-specific and intra-specific competition (Fresh 1997). However, the extent of this affect, if any, is unknown, especially in light of the fact that native oysters were once present in large quantities co-evolving with the salmon, though the native oysters tended to be found in sub-tidal areas, rather than the inter-tidal areas generally used for shellfish culture. Any affects might also be offset by the structure that oyster shells create, structure which creates shelter for a diverse biota.

The use of artificial reefs can also impact the aquatic environment through the loss of habitat upon which the reef material is placed or the use of inappropriate materials in construction. Usually, reef materials are set upon flat sand bottoms or “biological deserts” which end up burying or smothering faunal and bottom-dwelling organisms at the site or even preventing mobile forms (e.g., benthic-oriented fish species) from utilizing the area as habitat. The use of materials that may be inappropriate for the marine environment (e.g., automobile tires; compressed incinerator ash) may serve as potential sources of toxic

releases or physical damage to existing habitat when breaking free of their anchoring systems (Collins *et al.* 1994).

1.5.1.17. General Conditions

The proposed General Conditions are designed to further minimize any potential impacts associated with the categories. As such, they are not expected to have a deleterious impact to anadromous fish.

1.5.1.18. Standard Operating Procedures

The proposed Standard Operating Procedures are designed to ensure adequate evaluation of a proposed project's potential impact on listed salmonids; to restrict the activities to avoid and/or minimize those impacts; to expedite approval of projects that do not require individual consultation; and to keep NMFS informed of COE's permitting activities. As such, NMFS believes that the proposed Standard Operating Procedures are not expected to adversely affect anadromous fish.

1.5.2. Effects on Critical Habitat

NMFS designates critical habitat based on physical and biological features that are essential to the listed species. Essential features for designated critical habitat include substrate, water quality, water quantity, water temperature, food, riparian vegetation, access, water velocity, space and safe passage.

Effects to critical habitat from these categories are included in the effects description expressed above.

1.5.3. Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Other activities within the watershed have the potential to impact fish and habitat within the action area. Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes.

Non-Federal activities within the action area are expected to increase with a projected 34 percent increase in human population over the next 25 years in Oregon (Oregon Department of Administrative Services 1999). Thus, NMFS assumes that future private and State actions will continue within the action area, but at increasingly higher levels as population density climbs.

1.6. Conclusion

The NMFS has determined, based on the information, analysis, and assumptions described in this Opinion, that the COE's proposed permit conditions for the fifteen categories of activities are not likely to jeopardize the continued existence of the listed salmon and steelhead shown in Table 1. In arriving at

this determination, NMFS considered the status of the listed salmon and steelhead, environmental baseline conditions, the direct and indirect effects of approving the action, and the cumulative effects of actions anticipated in the action area. The NMFS evaluated the proposed action and found that it would cause short-term adverse degradation of some environmental baseline indicators for listed salmon and steelhead. However, the proposed action is not expected to result in further degradation of aquatic habitats over the long term. Thus, the effects of the proposed action would not reduce prespawning survival, egg-to-smolt survival, or upstream/downstream migration survival rates to a level that would appreciably diminish the likelihood of survival and recovery of proposed or listed fishes, nor is it likely to result in destruction or adverse modification of critical habitats.

1.7. Conservation Recommendations

Section 7 (a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitats, or to develop additional information. NMFS believes the following conservation recommendations are consistent with these obligations, and therefore should be carried out by the COE:

1. To the greatest extent possible, the COE should develop a database that consists of all existing permits that have resulted in projects in these 15 categories. The database should be compatible with monitoring information that will be produced to meet the requirements of this Opinion. Thus each project entered into the database should be identified by 5th field hydrological unit code (HUC), and contain, where possible, the following information: 1) Permit number; 2) applicant name; 3) project name; 4) the category of activity under which the permit was issued; 5) location by river mile and latilong; 5) starting and ending dates for work done under the permit; and 6) the COE contact person.

The NMFS is particularly interested in an accounting of the following types of projects: Erosion control, utility stream crossings, road crossings, discharge and excavations, maintenance dredging, and fish and wildlife devices and activities. For projects involving erosion control, where possible, please also provide the following information: 1) The justification for the work; 2) a description of the materials used; 3) project size (width and linear feet); and 4) whether one or both banks were stabilized.

2. The COE should also develop another database, compatible with monitoring data that will be collected under this Opinion and with the database described in conservation recommendation #1, above, consisting of all permits the COE has issued, and will issue in the future, for categories of activities that are not included in this consultation.

NMFS believes this information will help to reduce uncertainty about the effects of past and ongoing human and natural factors leading to the status of listed salmon and steelhead, their habitats, and the aquatic ecosystem within the Portland District of the COE.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects, or those that benefit listed salmon and steelhead or their habitats, NMFS requests notification of the achievement of any conservation recommendations when the COE submits its annual report describing achievements of the permitting process for the fifteen categories of activities during the previous year.

1.8. Reinitiation of Consultation

Consultation must be reinitiated after three years. It also must reinitiated if: The amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16). To reinitiate consultation, COE should contact the Habitat Conservation Division (Oregon State Office) of NMFS.

2. INCIDENTAL TAKE STATEMENT

Sections 4 (d) and 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. Harass is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. Incidental take is take of listed species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

2.1. Amount or Extent of the Take

The NMFS anticipates that the action covered by this Opinion has more than a negligible likelihood of resulting in incidental take of the species listed in Table 1. Effects of actions such as these are largely unquantifiable and are not expected to be measurable as long-term effects on population levels. Therefore, even though NMFS expects some low level incidental take to occur due to the actions covered by this Opinion, the best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take to the species itself. In instances such as

these, the NMFS designates the expected level of take as "unquantifiable." Based on the information in the BA, NMFS anticipates that an unquantifiable amount of incidental take could occur as a result of the actions covered by this Opinion.

2.2. Reasonable and Prudent Measures

The measures described below are non-discretionary. They must be implemented so that they become binding conditions in order for the exemption in section 7(a)(2) to apply. The COE has the continuing duty to regulate the activities covered in this incidental take statement. If the COE fails to require the applicants to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. The NMFS believes that activities carried out in a manner consistent with these reasonable and prudent measures, except those otherwise identified, will not necessitate further site-specific consultation. Activities which do not comply with all relevant reasonable and prudent measures will require further individual consultation.

The NMFS believes that the following reasonable and prudent measures are necessary and appropriate to minimize the likelihood of take of listed fish resulting from implementation of this Opinion. These reasonable and prudent measures would also minimize adverse effects to designated critical habitat.

1. Minimize the likelihood of incidental take from erosion control activities requiring streambank and shoreline protection by applying permit conditions requiring use of an ecological approach to bank protection and the best available bioengineering technology.

2. Minimize the likelihood of incidental take from water control activities by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

3. Minimize the likelihood of incidental take from utility lines by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

4. Minimize the likelihood of incidental take from road construction, repairs and improvements by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

5. Minimize the likelihood of incidental take from site preparation for construction of buildings and related features by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

6. Minimize the likelihood of incidental take from stream and wetland restoration activities by complying with certified watershed conservation plan.

7. Minimize the likelihood of incidental take from boat ramps by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

8. Minimize the likelihood of incidental take from other minor discharges and excavation by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

9. Minimize the likelihood of incidental take from installation and repair of navigational aids by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

10. Minimize the likelihood of incidental take from maintenance of existing structures and marinas by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

11. Minimize the likelihood of incidental take from installation of small temporary floats by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

12. Minimize the likelihood of incidental take from structures in fleeting and anchorage areas by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

13. Minimize the likelihood of incidental take from maintenance dredging by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

14. Minimize the likelihood of incidental take from return water from upland contained dredging areas by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

15. Minimize the likelihood of incidental take from fish and wildlife harvest, attraction devices and activities by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

16. Minimize the likelihood of incidental take from activities involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

17. Ensure the effective administration of standard local operating procedures for endangered species (SLOPES), including a comprehensive monitoring and reporting program to ensure this programmatic biological opinion is meeting its objective of minimizing the likelihood of take from permitted activities.

2.3. Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, COE must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for each category of activity. These terms and conditions are non-discretionary. Many of the terms and conditions are relevant to more than one category of activity (e.g. conditions to minimize turbidity

increases are equally important in erosion control, stream and wetland restoration, maintenance dredging, road construction, etc.). Therefore, terms and conditions listed under one category of activity are also terms and conditions of any category in which they would also minimize impacts to salmonids.

1. To Implement Reasonable and Prudent Measure #1 (erosion control activities), above, the COE shall ensure that:

a. Permits for erosion control are not issued under this Opinion to authorize any erosion control activity that proposes:

i. Installation of rock or riprap intended to function as a bulkhead or revetment at a height above the toe of a slope;[4] or

ii. placement of more than 10 cubic yards of rock or riprap per 100 linear feet of streambank in a trench at the toe of slope or in a scour hole.

b. Conservation goal. The conservation goal of erosion control activities authorized under this permit is to provide the greatest degree of natural habitat function that is economically achievable through the application of an ecological approach to bank protection and the best available bioengineering[5] practices, technologies, processes, siting criteria, operating methods, or other alternatives.

c. Supporting analysis: Erosion control. Authorization of erosion control activities, including any reconstruction, repairs or improvements to sites already hardened, must be based on a written assessment of how the conservation goal will be achieved based on an evaluation of the following four factors:[6]

i. The mechanism of the bank failure based on the geometry of the bank and channel at the project site (e.g., toe and bank surface erosion, local scour, avulsion, mass wasting);

ii. the cause of the bank failure (e.g., natural channel evolution, increased flows, loss of bank vegetation, floodplain activities);

iii. existing riparian and aquatic habitat conditions that must be protected or mitigated by the project to protect the site's productive capacity and opportunities for restoration in the future; and

iv. the risk of bank erosion to safety, property and habitat, including economic cost to the extent known.

d. Bioengineering Practices. The following specific bioengineering practices must be incorporated into each project authorized under this Opinion:

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[4] "Toe" means the break in slope a the foot of a bank where the bank meets the bed.

[5] "Bioengineering" means the use of live and dead plant materials to stabilize hill slopes, streambanks or shorelines. Examples include facines, bundles, logs, root wads that are often used in conjunction with soil or other hard structures such as rocks, boulders or wood crib structures.

[6] See, Washington Department of Fish and Wildlife and Inter-Fluve, Inc., *Integrated Streambank Protection Guidelines*, various pagination (Draft)(April 28, 1998)(guidance on ecological approach to management of eroding streambanks)(http://www.wsdot.wa.gov/fossc/maint/4d_rule/PDFs/Appendix_23_Streambank.pdf).

i. Avoid or minimize the use of rock and riprap. When rock must be used in conjunction with other erosion controls below bankfull elevation,[7] class 350 metric or larger rock is preferred unless it will constrict the channel migration zone.

ii. Wood placement will only include complex large wood to provide functional refugia habitat for fish (e.g. root wads shall not be trimmed).

iii. Erosion controls will not encroach upon the stream thalweg, or impair natural stream flows into or out of secondary channels or riparian wetlands. The Embankment toe will not extend any further into the active channel than the toe of the existing embankment to be stabilized.

iv. The bankline will be revegetated using natural vegetation.

e. Construction. All erosion control activities involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage, must also meet all applicable terms and conditions to implement Reasonable and Prudent Measure #16 (general construction conditions).

f. Monitoring: Erosion control. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting all permit conditions. This report will consist of the following information.

i. Project identification.

(1) Permit number;
(2) applicant's name;
(3) project name;
(4) category of activity under which the permit was issued;
(5) location by 5th field hydrological unit code (HUC) and latilong;
(6) starting and ending dates for work performed under the permit; and
(7) the COE contact person.

ii. A copy of the supporting analysis.

(1) The justification for the work in terms of erosion mechanism, erosion cause, habitat conditions, and erosion risk;
(2) description of bioengineering methods used;
(3) materials used;
(4) project size (width and linear feet);
(5) whether one or both banks were stabilized;

iii. A narrative assessment of the project's effects on natural stream function.

iv. Photographic documentation of environmental conditions at the project site before, during and after project completion.

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[7] "Bankfull elevation" means the bank height inundated by a 2-year average recurrence interval and may be estimated by morphological features such average bank height, scour lines and vegetation limits. "Channel migration zone" means the area defined by the lateral extent of likely movement along a stream reach where there is evidence of active stream channel movement over the past 100 years, e.g., alluvial fans or floodplains formed where the channel gradient decreases, the valley abruptly widens, or at the confluence of larger streams.

(1) Photographs will include general project location views and close-ups showing details of project areas and projects, including pre and post bank stabilization.

(2) Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.

(3) Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

v. Copies of all erosion control inspection reports, including a description of any failures experienced with conservation measures and efforts made to correct them.

2. To implement Reasonable and Prudent Measure #2 (water control activities) above, the COE shall ensure that:

a. Permits for water control activities are not issued under this Opinion that will:

i. Impair connectivity between off-channel areas, wetlands, and the main channel; or

ii. authorize installation of any new dike, levee, tide gate, pump station, or related facility in any of the following areas:

(1) Adjacent to, or upstream of, freshwater spawning areas;

(2) waters on 303(d) list for temperature, flow modification, or habitat modification; or

(3) tidal marshes or estuaries, except to maintain or improve existing tide gates that meet the following criteria for fish passage and in-water work.

b. Erosion control. All water control activities involving placement of material along or adjacent to streambanks for the purpose of preventing bank erosion must also meet all terms and conditions for Reasonable and Prudent Measure #1 (erosion control).

c. Construction. All water control activities involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage, must also meet all applicable terms and conditions to implement Reasonable and Prudent Measure #16 (construction).

d. Receiving water quality and quantity. Any discharge from a water control facility built pursuant to a permit issued under this Opinion must be managed to ensure that it will meet state water quality standards for temperature, turbidity, and other criteria at the point of discharge and will not significantly alter instream flow rates, including the timing, magnitude or duration of instream peak flows.

e. Tide gates. If existing tide gates are maintained or improved, the gates will be designed to minimize and avoid obstructions to fish passage by placing the hinge at the top and using a float arm or other mechanism to:

i. slow the speed of opening and closing;

ii. slow the velocity of water passing through the gate;

iii. ensure that the gate will remain fully open to release upland drainage when a positive difference in upstream head is present and will remain fully closed to prevent inflow when the upstream head is negative; and

iv. not dewater downstream reaches.

f. Monitoring: Water control structures. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting all permit conditions. This report will consist of the following information.

i. Project identification.

(1) Permit number;

(2) applicant's name;

(3) project name;

(4) category of activity under which the permit was issued;

(5) location by 5th field hydrological unit code (HUC) and latilong;

(6) starting and ending dates for work performed under the permit; and

(7) the COE contact person.

ii. A narrative assessment of the project's effects on natural stream function.

iii. Photographic documentation of environmental conditions at the project site before, during and after project completion.

(1) Photographs will include general project location views and close-ups showing details of project areas and projects, including pre and post bank stabilization

(2) Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.

(3) Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

iv. Copies of all water control inspection reports, including a description of any failures experienced with conservation measures and efforts made to correct them.

3. To implement Reasonable and Prudent Measure #3 (utility lines) above, the COE shall ensure that:

a. Permits for utility line activities are not issued under this Opinion to authorize any utility line activity that proposes:

(1) Construction of any new permanent roads within the riparian zone;

(2) use of open trench excavation in running water;

(3) temporary stream diversion; or

(4) placement of a utility line above the bed of marine waters at depths less than -10.0 feet of the mean lower low water (MLLW).

b. Supporting analysis: Utility stream crossing. Authorizations of utility line activities that include stream crossing must be based on a written assessment of the following considerations.

i. Location. Stream crossings will be placed as follows:

(1) Areas with evidence of vertical or lateral instability, landslides, slumping, or active fissures or faults are avoided.

(2) Alignments are perpendicular to the watercourse, or nearly so.

(3) Lines will not be exposed due to any lateral migration, head cutting, general scour, or debris loading associated with the 100-year flood flow to reduce the need for future maintenance.

(4) Lines in saltwater and estuarine areas will not interfere with erosion, nutrient and debris transport, and other natural tidal processes, and will not be placed on the bed of marine waters landward of -10.0 feet of the Mean Lower Low Water (MLLW) to provide for movement and migration of fish life in the near-shore area.

ii. Design. Stream crossing designs will be used in the following priority.

(1) Aerial lines, including conduit lines hung from existing bridges in a manner which prevents damage by flooding events;

(2) directional drilling, boring and jacking; or

(3) dry trenching or plowing – authorized for dry streams with no water present.

c. Directional drilling. If directional drilling or boring or jacking methods are used for utility line projects, the following will apply.

i. Lines installed using boring and jacking or directional drilling must span the channel migration zone[8] and any associated or adjacent wetlands.

ii. Bore and jack pits, or directional drill recovery/recycling pits, and any associated waste or spoils, will be completely isolated from surface waters.

iii. If a bore hole crack or collapse occurs to the extent that drilling fluid or sediment is visible within the water or streambed, all drilling activity will cease and biologists from NMFS and the Oregon Department of Fish and Wildlife (ODFW) both must be consulted regarding the extent of the risk to fish life. Directional boring will only resume after consultation and specific approval by the NMFS and ODFW biologists.

iv. All drilling fluids not recycled must be recovered and disposed of outside of the floodplain to prevent re-entry into the water.

v. Bore and jack pits, directional drill recovery/recycling pits, or other excavations associated with conduit installation will be located to prevent damage to the

[8] "Channel migration zone" means the area defined by the lateral extent of likely movement along a stream reach where there is evidence of active stream channel movement over the past 100 years, e.g., alluvial fans or floodplains formed where the channel gradient decreases, the valley abruptly widens, or at the confluence of larger streams.

streambed and banks, and must prevent wastewater or spoil material from entering the water.

d. Trenching. If trenching or plowing methods are used for utility line projects, the following will apply.
   i. Trenching and plowing will occur in the dry.
   ii. Within the ordinary high water line, trenches will be backfilled with native material and capped with clean, rounded, uniformly-graded gravel with a size composition and depth as exists naturally.

e. Erosion control. All utility line activities involving placement of material along or adjacent to streambanks for the purpose of preventing bank erosion must also meet all terms and conditions for Reasonable and Prudent Measure #1 (erosion control).

f. Construction. All utility line activities involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage, must also meet all applicable terms and conditions to implement Reasonable and Prudent Measure #16 (construction).

g. Monitoring: Utility stream crossing. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting all permit conditions. This report will consist of the following information.

h. Project identification.
   i. Permit number;
   ii. applicant's name;
   iii. project name;
   iv. category of activity under which the permit was issued;
   v. location by 5th field hydrological unit code (HUC) and latilong;
   vi. starting and ending dates for work performed under the permit; and
   vii. the COE contact person.

i. A copy of the supporting analysis, including the location and design.

j. A narrative assessment of the project's effects on natural stream function.

k. Photographic documentation of environmental conditions at the project site before, during and after project completion.
   i. Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.
   ii. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
   iii. Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

4. To implement Reasonable and Prudent Measure #4 (road construction, repairs and improvements) above, the COE shall ensure that:

a. Permits for road construction, repair and improvement actions are not issued under this Opinion to authorize any road construction, repair or improvement that proposes:
   i. Construction of a new, permanent road within 150 feet of a stream or water body that is occupied by listed salmonids during any part of the year;[9]
   ii. construction of a new, permanent road within 50 feet of a stream or water body that is not occupied by listed salmonids but discharges into a stream that is occupied;
   iii. construction of a new bridge pier or abutment below the bankfull elevation; or
   iv. an increase in new impervious surface exceeding 0.5 acres.

b. Erosion control. All road construction, repair and improvement activities involving placement of material along or adjacent to streambanks for the purpose of preventing bank erosion must also meet all terms and conditions for Reasonable and Prudent Measure #1 (erosion control).

c. Construction. All road construction, repair and improvement activities involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage, must also meet all applicable terms and conditions to implement Reasonable and Prudent Measure #16 (construction).

d. Supporting analysis: Road stream crossing. Authorizations of road construction, repairs and improvements that include stream crossing must be based on a written assessment of the following considerations:
   i. All crossings must comply with ODFW guidelines and criteria for stream-road crossings.[10]
   ii. Fill width will be limited as follows:
      (1) Fill width will be limited to the minimum necessary to complete the crossing;
      (2) width of roadway prism will not increase by more than 20 percent of the existing roadway surface width; and
      (3) any increase in width will be mitigated at 2:1 ratio as measured by area affected.
   iii. Existing stream width will not be reduced.
   iv. All stormwater runoff from any road or road crossing built pursuant to a permit issued under this Opinion must be managed to ensure that it will meet state water quality standards for temperature, turbidity, and other criteria before reaching a receiving water and will not significantly alter instream flow rates, including the timing, magnitude or duration of instream peak flows.

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[9] All distances from a stream or water body are measured horizontally from the bankfull elevation, the edge of the channel migration zone, or the edge of any associated wetland, whichever is greater.

[10] Appendix A, Oregon Department of Fish and Wildlife Guidelines and Criteria for Stream-Road Crossings, in: G.E. Robison, A. Mirati, and M. Allen, *Oregon Road/Stream Crossing Restoration Guide: Spring 1999* (rules, regulations and guidelines for fish passage through road/stream crossings under the Oregon Plan) (http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/orfishps.htm).

e. Maintenance. Road maintenance must comply with the ODOT guidelines.[11]

f. Culverts. Culverts will be constructed, maintained, repaired or improved as follows:

i. All work will be done in the dry, unless it is demonstrated that no listed or proposed fish, including rearing juveniles, are likely to be present during project activities;

ii. culvert designs must comply with ODFW guidelines and criteria for stream-road crossings[12] with appropriate grade controls to prevent culvert failure due to changes in stream elevation; and

iii. culverts must be cleaned by working from the top of the bank to remove only the minimum amount of wood, sediment and other natural debris necessary to maintain culvert function without disturbing and spawning gravels.

g. Scour holes. Scour holes at the base of bridge piers or abutments will be repaired by placing no more riprap than is necessary to reach the level of the stream bed.

h. Monitoring: Road Construction, Repairs and Improvements. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting permit conditions. This report will consist of the following information.

i. Project identification.

i. Permit number;

ii. applicant's name;

iii. project name;

iv. category of activity under which the permit was issued;

v. location by 5th field hydrological unit code (HUC) and latilong;

vi. starting and ending dates for work performed under the permit; and

vii. the COE contact person.

j. A copy of the supporting analysis for any road crossing, including application of ODFW guidelines and criteria for stream-road crossings, fill width, effect on stream width, and stormwater runoff treatment.

k. A narrative assessment of the project's effects on natural stream function.

l. Photographic documentation of environmental conditions at the project site before, during and after project completion.

i. Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.

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[11] Oregon Department of Transportation, *Routine Road Maintenance: Water Quality and Habitat Guide, Best Management Practices*, 21 pp. + appendices (July 1999)(providing guidance on routine road maintenance activities only) (http://www.odot.state.or.us/eshtm/images/4dman.pdf).

[12] Appendix A, Oregon Department of Fish and Wildlife Guidelines and Criteria for Stream-Road Crossings, in: G.E. Robison, A. Mirati, and M. Allen, *Oregon Road/Stream Crossing Restoration Guide: Spring 1999* (rules, regulations and guidelines for fish passage through road/stream crossings under the Oregon Plan) (http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/orfishps.htm).

ii. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.

iii. Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

5. To implement Reasonable and Prudent Measure #5 (site preparation for buildings and related structures) above, the COE shall ensure that:

a. Permits for site preparation for buildings and related structures are not authorized under this Opinion for site preparation for buildings and related structures that proposes:

i. Site preparation within 150 feet of a stream or water body that is occupied by listed salmonids during any part of the year; or

ii. site preparation within 50 feet of a stream or water body that is not occupied by listed salmonids but discharges into a stream that is occupied.

b. Erosion control. All site preparation for buildings and related structure activities involving placement of material along or adjacent to streambanks for the purpose of preventing bank erosion must also meet all terms and conditions for Reasonable and Prudent Measure #1 (erosion control).

c. Construction. All site preparation for buildings and related structure activities involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage, must also meet all applicable terms and conditions to implement Reasonable and Prudent Measure #16 (construction).

d. Stormwater management. All stormwater runoff from any building or related structure built as a result of site preparation authorized under this Opinion must be managed to ensure that it will meet state water quality standards for temperature, turbidity, and other criteria before it reaches a receiving water and will not significantly alter instream flow rates, including the timing, magnitude or duration of instream peak flows.

e. Monitoring: Site preparation for buildings and related structures. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting permit conditions. This report will consist of the following information.

f. Project identification.

i. Permit number;

ii. applicant's name;

iii. project name;

iv. category of activity under which the permit was issued;

v. location by 5th field hydrological unit code (HUC) and latilong;

vi. starting and ending dates for work performed under the permit; and

vii. the COE contact person.

g. A narrative assessment of the project's effects on natural stream function.

h. Photographic documentation of environmental conditions at the project site before, during and after project completion.
    i. Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.
    ii. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
    iii. Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

6. To implement Reasonable and Prudent Measure #6 (stream and wetland restoration activities) above, the COE shall ensure that permits are <u>not</u> issued under this Opinion to authorize restoration projects until the State of Oregon completes NMFS-approved state guidelines to certify watershed conservation plans. Thereafter, the COE shall only issue permits for those restoration projects that the COE finds are part of, and conducted pursuant to, a watershed conservation plan that the State of Oregon has certified using those guidelines.

7. To implement Reasonable and Prudent Measure #7 (boat ramps) above, the COE shall ensure that:

a. Permits for boat ramps are not issued under this Opinion to authorize any boat ramp or related facility that proposes:
    i. Access walkways, docks and related features wider than eight feet;
    ii. covered moorages;
    iii. ramps and related features in an estuary that will displace submerged aquatic vegetation as determined by a pre-construction survey;
    iv. use of treated wood or piles for any structure; or
    v. an increase in new impervious surface exceeding 0.5 acres.

b. <u>Erosion control</u>. All boat ramps and related facilities requiring placement of material along or adjacent to streambanks for the purpose of preventing bank erosion must also meet all terms and conditions for Reasonable and Prudent Measure #1 (erosion control).

c. <u>Construction</u>. All aquatic facility activities involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage, must also meet all applicable terms and conditions to implement Reasonable and Prudent Measure #16 (construction).

d. <u>Access walkways, docks and related features</u>. All access walkways, docks and related features will be constructed as follows.
    i. All walkways, docks, and related features wider than four feet will include grating, translucent panels, or other light diffusers to maintain a minimum of 60 percent of the ambient light levels.

ii. All flotation will be encapsulated to permanently prevent the breakup loss of flotation.

iii. All floats will be placed in deep enough water to prevent grounding and ensure one foot of water is maintained between the river bed and the bottom of any float.

iv. Mooring buoys will be placed in water deep enough so that moored boats never ground out or prop wash the bottom.

e. Piscivorus bird deterrence. All pilings and navigational aids, such as moorings, and channel markers, will be fitted with devices to prevent perching by piscivorus bird species.

f. Non-water dependent facilities. All parking lots, picnic areas, toilets, trails and other non-water dependent facilities will be constructed as follows.

i. All non-water dependent facilities will be located 150 feet or more from any stream or water body occupied by listed salmonids during any part of the year.

ii. All non-water dependent facilities will be located 50 feet or more from any stream or water body that is not occupied by listed salmonids but discharges into a stream that is occupied.

iii. All runoff from parking lots and other impervious surfaces will be collected and treated to remove contaminants prior to return to any receiving waters. All runoff will meet state water quality standards for temperature, turbidity, and other state water quality criteria before it reaches a receiving water and will not significantly alter instream flow, including the timing, magnitude or duration of instream peak flows.

g. Monitoring: Boat ramps. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting permit conditions. This report will consist of the following information.

h. Project identification.

i. Permit number;

ii. applicant's name;

iii. project name;

iv. category of activity under which the permit was issued;

v. location by 5th field hydrological unit code (HUC) and latilong;

vi. starting and ending dates for work performed under the permit; and

vii. the COE contact person.

i. A narrative assessment of the project's effects on natural stream function.

j. Photographic documentation of environmental conditions at the project site before, during and after project completion.

i. Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.

ii. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.

iii. Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

8. To implement Reasonable and Prudent Measure #8 (other minor discharges and excavations)[13] above, the COE shall ensure that:

a. Permits for minor discharge or excavation actions are not issued under this Opinion to authorize any minor discharge or excavation that proposes stream diversion during construction.

b. Erosion control. All activities involving placement of material along or adjacent to streambanks for the purpose of preventing bank erosion must also meet all terms and conditions for Reasonable and Prudent Measure #1 (erosion control).

c. Construction. All activities involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage, must also meet all applicable terms and conditions to implement Reasonable and Prudent Measure #16 (construction).

d. Discharge and outfall management. Any activity involving a water discharge or an outfall authorized under this Opinion must be managed to ensure that discharge will meet state water quality standards before reaching a receiving water and will not significantly alter instream flow rates, including the timing, magnitude or duration of instream peak flows.

e. Fish screen. Any water intake structure authorized under this Opinion must have a fish screen installed, operated and maintained in accordance to NMFS' fish screen criteria.[14]

f. Supporting analysis: Dredging. Authorization of a dredging activity under this Opinion must be based on a written assessment of the following:

i. Environmentally acceptable alternatives for management of the dredged material;[15] and for projects in estuarine or marine environments,

ii. benthic invertebrate species composition and productivity.

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[13] "Minor discharges and excavations" means small structural fills, minor excavations or dredging such as that necessary for culvert maintenance, installation of outfall structure and minor repairs of previously authorized structures.

[14] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996)(guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

[15] U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Oregon Department of Environmental Quality, Washington Department of Ecology, and Washington Department of Natural Resources, *Dredged Material Evaluation Framework: Lower Columbia River Management Area* (November 1998)(providing a consistent set of procedures to determine sediment quality for dredging activities)(http://www.nwp.usace.army.mil/ec/h/hr/Final/).

g. Dredge spoil dewatering. Discharge water from any upland facility used to store spoils dredged pursuant to a permit issued under this Opinion must be managed to ensure that:
   i. The discharge is detained or treated to meet state water quality standards for temperature, turbidity, and other criteria before reaching a receiving water, and will not significantly alter instream flow rates, including the timing, magnitude or duration of instream peak flows; and
   ii. no outfall or diffuser port will discharge water at a rate exceeding four feet per second.

h. Culvert maintenance. Culverts will be constructed, maintained, repaired or improved as follows:
   i. All work will be done in the dry, unless it is demonstrated that no listed or proposed fish, including rearing juveniles, are likely to be present during project activities;
   ii. culvert designs must comply with ODFW guidelines and criteria for stream-road crossings[16] with appropriate grade controls to prevent culvert failure due to changes in stream elevation; and
   iii. culverts must be cleaned by working from the top of the bank to remove only the minimum amount of wood, sediment and other natural debris necessary to maintain culvert function without disturbing and spawning gravels.

i. Monitoring: Other minor discharges and excavation. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting permit conditions. This report will consist of the following information.

j. Project identification.
   i. Permit number;
   ii. applicant's name;
   iii. project name;
   iv. category of activity under which the permit was issued;
   v. location by 5th field hydrological unit code (HUC) and latilong;
   vi. starting and ending dates for work performed under the permit; and
   vii. the COE contact person.

k. A copy of the supporting analysis for any dredging, including environmentally acceptable alternatives for management of the dredged material and, for projects in estuarine or marine environments, benthic invertebrate species composition and productivity.

l. A narrative assessment of the project's effects on natural stream function.

m. Photographic documentation of environmental conditions at the project site before, during and after project completion.

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[16] Appendix A, Oregon Department of Fish and Wildlife Guidelines and Criteria for Stream-Road Crossings, in: G.E. Robison, A. Mirati, and M. Allen, *Oregon Road/Stream Crossing Restoration Guide: Spring 1999* (rules, regulations and guidelines for fish passage through road/stream crossings under the Oregon Plan) (http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/orfishps.htm).

i. Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.
ii. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
iii. Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

9. To implement Reasonable and Prudent Measure #9 (installation and repair of navigational aids) above, the COE shall ensure that:

a. Erosion control. All installation and repair of navigational aid activities involving placement of material along or adjacent to streambanks for the purpose of preventing bank erosion must also meet all terms and conditions for Reasonable and Prudent Measure #1 (erosion control).

b. Construction. All installation and repair of navigational aids activities involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage, must also meet all applicable terms and conditions to implement Reasonable and Prudent Measure #16 (construction).

c. Piscivorus bird deterrence. All pilings and navigational aids, such as moorings, and channel markers, will be fitted with devices to prevent perching by piscivorus bird species.

d. Monitoring: Installation and repair of navigational aids. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting permit conditions. This report will consist of the following information:

e. Project identification.
i. Permit number;
ii. applicant's name;
iii. project name;
iv. category of activity under which the permit was issued;
v. location by 5th field hydrological unit code (HUC) and latilong;
vi. starting and ending dates for work performed under the permit; and
vii. the COE contact person.

f. A narrative assessment of the project's effects on natural stream function.

g. Photographic documentation of environmental conditions at the project site before, during and after project completion.
i. Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.

ii. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.

iii. Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

10. To implement Reasonable and Prudent Measure #10 (maintenance of existing structures and marinas) above, the COE shall ensure that:

a. Permits for the maintenance of existing structures and marinas are not issued under this Opinion to authorize activity that proposes:

i. The use of treated wood or piles; or

ii. an increase in new impervious surface exceeding 0.5 acres.

b. Erosion control. All maintenance of existing structures and marinas activities involving placement of material along or adjacent to streambanks for the purpose of preventing bank erosion must also meet all terms and conditions for Reasonable and Prudent Measure #1 (erosion control).

c. Construction. All maintenance of existing structures and marinas activities involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage, must also meet all applicable terms and conditions to implement Reasonable and Prudent Measure #16 (construction).

d. Access walkways, docks and related features. All access walkways, docks and related features will be maintained, repaired, or relocated as follows:

i. All walkways, docks, and related features wider than four feet will include grating, translucent panels, or other light diffusers to maintain a minimum of 60 percent of the ambient light levels.

ii. All flotation will be encapsulated to permanently prevent the breakup loss of flotation.

iii. All floats will be placed in deep enough water to prevent grounding and ensure one foot of water is maintained between the river bed and the bottom of any float.

iv. Mooring buoys will be placed in water deep enough so that moored boats never ground out or prop wash the bottom.

e. Related upland (non-water dependent) facilities. Whenever parking lots, picnic areas, toilets, trails and other related upland (non-water dependent) facilities are maintained or repaired, they will be relocated as follows whenever reasonable.

i. All facilities will be located 150 feet or more from any stream occupied by listed salmonids during any part of the year;

ii. all facilities will be located 50 feet or more from any stream not occupied by listed salmonids but discharges into a stream that is occupied; and

iii. stormwater runoff from any upland facility built pursuant to a permit issued under this Opinion must be managed to ensure that it meets state water quality standards before reaching a receiving water and will not significantly alter instream flow rates, including the timing, magnitude or duration of instream peak flows.

f. Relocating marina structures. Marina structures will be relocated as follows:
   i. Structures may only be moved within the existing footprint of the moorage or into deeper water;
   ii. structures may not be moved to water shallower than 20 feet (MLLW); and
   iii. where water depth along the shoreline is deeper than 20 feet (MLLW), all structures will be located at least 30 feet away from the shoreline.

g. Piscivorus bird deterrence. All pilings and navigational aids, such as moorings, and channel markers, will be fitted with devices to prevent perching by piscivorus bird species.

h. Monitoring: Maintenance of existing structures and marinas. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting permit conditions. This report will consist of the following information.

i. Project identification.
   i. Permit number;
   ii. applicant's name;
   iii. project name;
   iv. category of activity under which the permit was issued;
   v. location by 5th field hydrological unit code (HUC) and latilong;
   vi. starting and ending dates for work performed under the permit; and
   vii. the COE contact person.

j. A narrative assessment of the project's effects on natural stream function.

k. Photographic documentation of environmental conditions at the project site before, during and after project completion.
   i. Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.
   ii. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
   iii. Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

11. To implement Reasonable and Prudent Measure #11 (installation of small temporary floats) above, the COE shall ensure that:

a. Permits for installation of small temporary floats are not issued under this Opinion to authorize any activity that proposes:

i. Installation of floats in areas with submerged vegetation;
ii. floating storage units or boat houses; or
iii. deployment of a temporary float for longer than of 21 days.

b. Float installation. All floats will be installed as follows:
i. All flotation must be entirely encapsulated to permanently prevent the breakup or loss of flotation material;
ii. floats may not be installed more than seven days in advance of the event;
iii. floats must be removed within five days of the end of the event; and
iv. floats must not ground out at low water; at least one foot of depth must be maintained between the river bed and the bottom of any float.

c. Piscivorus bird deterrence. Any piling used to anchor floats will be fitted with devices to prevent perching by piscivorus bird species.

d. Monitoring: Installation of small temporary floats. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting permit conditions. This report will consist of the following information.

e. Project identification.
i. Permit number;
ii. applicant's name;
iii. project name;
iv. category of activity under which the permit was issued;
v. location by 5th field hydrological unit code (HUC) and latilong;
vi. starting and ending dates for work performed under the permit; and
vii. the COE contact person.

f. A narrative assessment of the project's effects on natural stream function.

g. Photographic documentation of environmental conditions at the project site before, during and after project completion.
i. Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.
ii. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
iii. Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

12. To implement Reasonable and Prudent Measure #12 (structures in fleeting and anchorage areas) above, the COE shall ensure that:

a. Erosion control. Any fleeting or anchorage structure involving placement of material along or adjacent to streambanks for the purpose of preventing bank erosion must also meet all terms and conditions for Reasonable and Prudent Measure #1 (erosion control).

b. Construction. Any fleeting or anchorage structure involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage, must also meet all applicable terms and conditions to implement Reasonable and Prudent Measure #16 (construction).

c. Float installation. Any buoy or float will be installed as follows:
   i. All flotation must be entirely encapsulated to permanently prevent the breakup or loss of flotation material;
   ii. buoys and floats may not be installed before it is necessary to actively use the fleeting or anchorage area:
   iii. buoys and floats must be removed if from any fleeting or anchorage area that is not actively used;
   iv. floats must not ground out at low water; at least one foot of depth must be maintained between the river bed and the bottom of any float.

d. Piscivorus bird deterrence. Any piling used to anchor buoys, floats or other structures used in a fleeting or anchorage area will be fitted with devices to prevent perching by piscivorus bird species.

e. Monitoring: Structures in fleeting and anchorage areas. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting permit conditions. This report will consist of the following information.

f. Project identification.
   i. Permit number;
   ii. applicant's name;
   iii. project name;
   iv. category of activity under which the permit was issued;
   v. location by 5th field hydrological unit code (HUC) and latilong;
   vi. starting and ending dates for work performed under the permit; and
   vii. the COE contact person.

g. A narrative assessment of the project's effects on natural stream function.

h. Photographic documentation of environmental conditions at the project site before, during and after project completion.
   i. Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.
   ii. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
   iii. Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

13. To implement Reasonable and Prudent Measure #13 (maintenance dredging) above, the COE shall ensure that:

a. Permits for maintenance dredging are not issued under this Opinion to authorize any dredging activity that:
   i. is for the purpose of flood control or gravel extraction;
   ii. is located adjacent to, or upstream of, salmonid spawning habitat;
   iii. is scheduled for operation outside the in-water work period specified in the terms and conditions for Reasonable and Prudent Measure #16 (construction);
   iv. is associated with
      (1) stream diversion;
      (2) sediment that does not meet criteria for in-water disposal;
      (3) use of the *economic loading* method for hopper dredging;[17] or
   v. is likely to have a significant adverse affect on:
      (1) estuarine or marine benthic invertebrate species composition and productivity;
      (2) water quality (e.g., long-term increase in turbidity or toxics such as hydrogen sulfide, methane or organic acids); or
      (3) channel morphology (e.g., side channel isolation, disruption of instream gravel transport, or a decrease in channel stability such as head cutting, channel incision, channel widening).

b. Erosion control. All maintenance dredging activities involving placement of material along or adjacent to streambanks for the purpose of preventing bank erosion must also meet all terms and conditions for Reasonable and Prudent Measure #1 (erosion control).

c. Construction. All maintenance dredging activities involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage, must also meet all applicable terms and conditions to implement Reasonable and Prudent Measure #16 (construction).

d. Supporting analysis: Maintenance dredging. Authorization of a dredging activity under this Opinion must include a written assessment of the environmentally acceptable alternatives for management of the dredged material.[18]

e. Hydraulic dredge operation. When using a hydraulic dredge, the dredge intake must be operated at or below the surface of the material being removed, but may be raised a maximum of three feet above the bed for brief periods of purging or flushing.

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[17] "Economic loading" means pumping dredged material with a high water content into the containment area of a hopper dredge, and allowing highly turbid water to overflow over the holding area so that more consolidated material may be collected in the dredge containment area. This process results in a large turbidity plume from the dredge and is often preferred by the contractor performing the dredging because it saves time and money by increasing hopper dredge loads.

[18] U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Oregon Department of Environmental Quality, Washington Department of Ecology, and Washington Department of Natural Resources, *Dredged Material Evaluation Framework: Lower Columbia River Management Area* (November 1998)(providing a consistent set of procedures to determine sediment quality for dredging activities)(http://www.nwp.usace.army.mil/ec/h/hr/Final/).

f. Placement of dredge spoils. All dredged spoil will be permanently confined in an approved upland area where it cannot reenter the water body and must be large enough to allow settling.

g. Discharge water. Dredge spoil discharge water returning to the body of water from which it was dredged will be managed as follows.

i. Discharge water will be detained or otherwise treated to meet all state water quality standards, including turbidity at the end of the pipe.

ii. Discharge water will not exceed four feet per second at either the outfall or diffuser port.

h. Monitoring: Maintenance dredging. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting permit conditions. This report will consist of the following information.

i. Project identification.

i. Permit number;

ii. applicant's name;

iii. project name;

iv. category of activity under which the permit was issued;

v. location by 5th field hydrological unit code (HUC) and latilong;

vi. starting and ending dates for work performed under the permit; and

vii. the COE contact person.

j. A copy of the supporting analysis of environmentally acceptable alternatives for management of the dredged material.

k. A narrative assessment of the project's effects on natural stream function.

l. Photographic documentation of environmental conditions at the project site before, during and after project completion.

i. Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.

ii. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.

iii. Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

14. To implement Reasonable and Prudent Measure #14 (return water from upland disposal sites) above, the COE shall ensure that:

a. All return water from upland disposal sites built pursuant to a permit issued under this Opinion must be managed to ensure that it meets state water quality standards, including temperature and turbidity, before reaching a receiving water and will not significantly alter instream flow rates, including the timing or duration of instream peak flows.

b. Return water discharged from an outfall or diffuser port will not exceed four feet per second.

c. Monitoring: Return water from upland disposal sites. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting permit conditions. This report will consist of the following information:

d. Project identification.
   i. Permit number;
   ii. applicant's name;
   iii. project name;
   iv. category of activity under which the permit was issued;
   v. location by 5th field hydrological unit code (HUC) and latilong;
   vi. starting and ending dates for work performed under the permit; and
   vii. the COE contact person.

e. A narrative assessment of the project's effects on natural stream function.

f. Photographic documentation of environmental conditions at the project site before, during and after project completion.
   i. Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.
   ii. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
   iii. Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

15. To implement Reasonable and Prudent Measure #15 (fish and wildlife harvest, attraction devices and activities) above, the COE shall ensure that:

a. Permits for fish and wildlife harvest, attraction devices and activities actions are not issued under this Opinion to authorize any activity that involves:
   i. The following types of mariculture:
      (1) non-native species,
      (2) shellfish and prey species over eelgrass beds,
      (3) benthic culture methods, or
      (4) kelp harvest; or
   ii. the following types of habitat manipulation:
      (1) enclosure or impoundment of any tidally influenced wetlands,
      (2) significant alteration of areas of "high productivity" as determined by pre-operational sampling developed with input from state and Federal resource agencies, or
      (3) direct application of carbaryl or other pesticides.

iii. Supporting analysis: Fish and wildlife activities. Authorizations of fish and wildlife harvest, attraction devices and related activities must be based on a written assessment of the following considerations:

iv. The applicant must provide evidence that the proposed action will avoid, minimize and mitigate impacts to listed species.

v. Where cage mariculture operations are undertaken, water depths and circulation patterns will be investigated and will be adequate to preclude the buildup of waste products, excess feed, and chemical agents.

vi. Prior to construction of artificial reefs or other attraction devices, an evaluation of the impact resulting from the change in habitat (sand bottom to rocky reef, etc.) will be performed.

(1) The overall quantity of shellfish culture in the estuary will be considered in light of the estuarine food resources necessary for salmon.

(2) Any net pen structure will have small enough webbing to prevent entanglement of prey species.

(3) All facilities for shellfish culture will be geo-spatially referenced and mapped in relationship to eelgrass beds, and other estuarine resources.

b. Erosion control. All fish and wildlife harvest, attraction devices and related activities involving placement of material along or adjacent to streambanks for the purpose of preventing bank erosion must also meet all terms and conditions for Reasonable and Prudent Measure #1 (erosion control).

c. Construction. All fish and wildlife harvest, attraction devices and related activities involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage, must also meet all applicable terms and conditions to implement Reasonable and Prudent Measure #16 (construction).

d. Non-water dependent facilities. All parking lots, administrative offices, storage buildings, and other non-water dependent facilities will be constructed as follows.

i. All non-water dependent facilities will be located 150 feet or more from any stream or water body occupied by listed salmonids during any part of the year.

ii. All non-water dependent facilities will be located 50 feet or more from any stream or water body that is not occupied by listed salmonids but discharges into a stream that is occupied.

iii. All runoff from parking lots and other impervious surfaces will be collected and treated to remove contaminants prior to return to any receiving waters. All runoff will meet state water quality standards for temperature, turbidity, and other state water quality criteria before it reaches a receiving water and will not significantly alter instream flow, including the timing, magnitude or duration of instream peak flows.

e. Water supply system. All water supply systems authorized for enclosed mariculture facilities under this Opinion will be a closed, recirculating type and all water intake

structures will have a fish screen installed, operated and maintained in accordance to NMFS' fish screen criteria.[19]

f. Piscivorus bird deterrence. All pilings, dolphins, and related structures will be fitted with devices to prevent perching by piscivorus bird species.

g. Monitoring: Fish and wildlife harvest, attraction devices and activities: Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting permit conditions. This report will consist of the following information:

h. Project identification.
   i. Permit number;
   ii. applicant's name;
   iii. project name;
   iv. category of activity under which the permit was issued;
   v. location by 5th field hydrological unit code (HUC) and latilong;
   vi. starting and ending dates for work performed under the permit; and
   vii. the COE contact person.

i. A copy of the supporting analysis, including compliance with all design criteria, and completed evaluations of water depth and circulation, benthic morphology, and estuarine food web.

j. Post-construction surveys of artificial reefs or other attraction devices showing use by targeted species and other species.

k. A narrative assessment of the project's effects on natural stream function.

l. Photographic documentation of environmental conditions at the project site before, during and after project completion.
   i. Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.
   ii. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
   iii. Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

16. To implement Reasonable and Prudent Measure #16 (construction) above, the COE shall ensure that:

a. Project design. Each project will be individually reviewed to ensure that all reasonable alternatives to rip rap have been considered and impacts to natural resources have been

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[19] Nation Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996)(guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

avoided, minimized and mitigated, and that the following overall project design conditions are met.

i. Minimum area. Construction impacts will be confined to the minimum area necessary to complete the project.

ii. In-water work. All work within the active channel of all anadromous fish-bearing streams, or in systems which could potentially contribute sediment or toxicants to downstream fish-bearing systems, will be completed within the ODFW approved in-water work period;[20] except for Oregon Coast estuaries and tidally affected waters.

(1) Oregon Coast. In coastal estuarine and tidally affected waters, exclusive of the Columbia River watershed, work may occur under this Opinion only during that summer period designated by ODFW for the riverine reach immediately upstream of the tidally affected water (i.e., Tillamook Bay - July 1 to September 15). Actions occurring outside this window must seek separate Opinion.

(2) Work period extensions. Extensions of the in-water work period, including those for work outside the wetted perimeter of the stream but below the ordinary high water mark must be approved by biologists from NMFS.

(3) Isolation of in-water work area. During in-water work, if listed fish may be present, including incubating eggs or juveniles, and the project involves either significant channel disturbance or use of equipment instream, ensure that the work area is well isolated from the active flowing stream within a cofferdam (made out of sandbags, sheet pilings, inflatable bags, etc.), or similar structure, to minimize the potential for sediment entrainment. Furthermore, no ground or substrate disturbing action will occur within the active channel 300 feet upstream of potential spawning habitat as measured at the thalweg without isolation of the work area from flowing waters.

(a) Fish screen. Any water intake structure authorized under this Opinion must have a fish screen installed, operated and maintained in accordance to NMFS' fish screen criteria.[21]

(b) Seine and release. Prior to and intermittently during pumping attempts will be made to seine and release fish from the work isolation area as is prudent to minimize risk of injury.

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[20] Oregon Department of Fish and Wildlife, *Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, 12 pp (June 2000)(identifying work periods with the least impact on fish)(http://www.dfw.state.or.us/ODFWhtml/InfoCntrHbt/0600_inwtrguide.pdf).

[21] Nation Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996)(guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

(i) Seining will be conducted by or under the supervision of a fishery biologist experienced in such efforts and all staff working with the seining operation must have the necessary knowledge, skills, and abilities to ensure the safe handling of all ESA-listed fish.

(ii) ESA-listed fish must be handled with extreme care and kept in water to the maximum extent possible during seining and transfer procedures. The transfer of ESA-listed fish must be conducted using a sanctuary net that holds water during transfer, whenever necessary to prevent the added stress of an out-of-water transfer.

(iii) Seined fish must be released as near as possible to capture sites.

(iv) The transfer of any ESA-listed fish from the applicant to third-parties other than NMFS personnel requires written approval from the NMFS.

(v) The applicant must obtain any other Federal, state, and local permits and authorizations necessary for the conduct of the seining activities.

(vi) The applicant must allow the NMFS or its designated representative to accompany field personnel during the seining activity, and allow such representative to inspect the applicant's seining records and facilities.

(vii) A description of any seine and release effort will be included in a post-project report, including the name and address of the supervisory fish biologist, methods used to isolate the work area and minimize disturbances to ESA-listed species, stream conditions prior to and following placement and removal of barriers; the means of fish removal; the number of fish removed by species; the condition of all fish released, and any incidence of observed injury or mortality.

(c) Water pumped from the work isolation area will be discharged into an upland area providing over-ground flow prior to returning to the creek. Discharge will occur in such a manner as not to cause erosion.

(d) Discharges into potential fish spawning areas or areas with submerged vegetation are prohibited.

iii. Fish passage. Work will not inhibit passage of any adult or juvenile salmonid species throughout the construction period or after project completion. All culvert and road designs must comply with ODFW guidelines and criteria for

stream-road crossings[22] with appropriate grade controls to prevent culvert failure due to changes in stream elevation. Channel modifications which could adversely affect fish passage, such as by increasing water velocities, are not authorized by this Opinion.

iv. Pollution and erosion control plan. A Pollution and Erosion Control Plan (PECP) will be developed for each authorized project to prevent point-source pollution related to construction operations. The PECP will contain the pertinent elements listed below and meet requirements of all applicable laws and regulations:

(1) Methods that will be used to prevent erosion and sedimentation associated with access roads, stream crossings, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations and staging areas.

(2) Methods that will be used to confine and remove and dispose of excess concrete, cement and other mortars or bonding agents, including measures for washout facilities.

(3) A description of the hazardous products or materials that will be used, including inventory, storage, handling, and monitoring.

(4) A spill containment and control plan with notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that will be available on site, proposed methods for disposal of spilled materials, and employee training for spill containment.

(5) Measures that will be taken to prevent construction debris from falling into any aquatic habitat. Any material that falls into a stream during construction operations will be removed in a manner that has a minimum impact on the streambed and water quality.

v. Temporary access roads. Temporary access roads are designed as follows:

(1) Existing roadways or travel paths will be used whenever reasonable.

(2) Where stream crossings are essential, a survey must determine and map any potential spawning habitat within 1,000 feet upstream and downstream.

(3) No stream crossings will occur at known or suspected spawning areas or within 300 feet upstream of such areas where impacts to spawning areas may occur.

(4) Where stream crossings are essential, the crossing design will accommodate reasonably foreseeable risks (e.g., flooding and

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[22] Appendix A, Oregon Department of Fish and Wildlife Guidelines and Criteria for Stream-Road Crossings, in: G.E. Robison, A. Mirati, and M. Allen, *Oregon Road/Stream Crossing Restoration Guide: Spring 1999* (rules, regulations and guidelines for fish passage through road/stream crossings under the Oregon Plan) (http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/orfishps.htm).

associated bedload and debris) to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.

(5) Vehicles and machinery must cross riparian areas and streams at right angles to main the main channel wherever reasonable.

(6) Temporary roads within 150 feet of streams will avoid, minimize and mitigate soil disturbance and compaction by clearing vegetation to ground level and placing clean gravel over geotextile fabric.

(7) The number of stream crossings is minimized.

vi. Treated wood removal. Projects requiring treated wood removal will use the following precautions.

(1) Care will be taken to ensure that no treated wood debris falls into the water. If treated wood debris does fall into the water, it will be removed immediately.

(2) All treated wood debris will be disposed of at an approved disposal facility for treated wood.

(3) If treated wood pilings will be removed, the following conditions apply:

(a) Pilings to be removed will be dislodged with a vibratory hammer.

(b) Once loose, the pilings will be placed onto the construction barge or other appropriate dry storage location, and not left in the water or piled onto the stream bank.

(c) If pilings break during removal, the remainder of the submerged section will be left in place.

(d) Long- term disposal of the piles must be at an approved disposal area for hazardous materials of this classification.

(e) Projects involving pile removal require long-term monitoring to ensure that if altered currents expose more pile, it must also be removed.

vii. Cessation of work. All project operations, except efforts to minimize storm or high flow erosion, will cease under high flow conditions that may result in inundation of the project area.

b. Pre-construction activities. Prior to significant alteration of the action area, the following actions will be accomplished.

i. Boundaries of the clearing limits associated with site access and construction are flagged to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

ii. The following erosion control materials are onsite.

(1) A supply of erosion control materials (e.g., silt fence and straw bales) is on hand to respond to sediment emergencies. Sterile straw or hay bales will be used when available to prevent introduction of weeds.

(2) An oil absorbing, floating boom is available on-site during all phases of construction whenever surface water is present.

iii. All temporary erosion controls (e.g., straw bales, silt fences) are in-place and appropriately installed downslope of project activities within the riparian area. Effective erosion control measures will be in-place at all times during the contract, and will remain and be maintained until such time that permanent erosion control measures are effective.

c. Heavy Equipment. Heavy equipment use will be restricted as follows.

i. When heavy equipment is required, the applicant will use equipment having the least impact (e.g., minimally sized, rubber tired).

ii. Heavy equipment will be fueled, maintained and stored as follows.

(1) All equipment that is used for instream work will be cleaned prior to operations below the bankfull elevation. External oil and grease will be removed, along with dirt and mud. No untreated wash and rinse water will be discharged into streams and rivers without adequate treatment.

(2) Place vehicle staging, maintenance, refueling, and fuel storage areas a minimum of 150 feet horizontal distance from any stream.

(3) All vehicles operated within 150 feet of any stream or water body will be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected will be repaired before the vehicle resumes operation.

(4) When not in use, vehicles will be stored in the vehicle staging area.

d. Site preparation. Site preparation is completed in the following manner, including removal of stream materials, topsoil, surface vegetation and major root systems.

i. Any instream large wood or riparian vegetation that is moved or altered during construction will stay on site or be replaced with a functional equivalent.

ii. Clearing and grubbing will not exceed 250 square feet within 150 feet of any stream occupied by listed salmonids during any part of the year, or within 50 feet of any stream not occupied by listed salmonids.

iii. Tree removal will be strictly limited.

(1) All perennial and intermittent streams: No tree (3 inches diameter at breast height or greater) will be removed from within 50 feet horizontal distance of the ordinary high water mark.

(2) On any stream supporting a listed salmonid: No more than 5 trees (3 inches diameter at breast height or greater) total may be removed from the area spanning 50 feet to 150 feet horizontal distance from the ordinary high water mark.

(3) Tree removal will be mitigated for onsite by a 2:1 replanting ratio.

iv. Whenever the project area is to be revegetated or restored, native channel material, topsoil and native vegetation removed for the project should be stockpiled for redistribution on the project area.

e. Earthwork. Earthwork, including drilling, blasting, excavation, dredging, filling and compacting, is completed in the following manner:

i. Boulders, rock, woody materials and other natural construction materials used for the project must be obtained from outside of the riparian area.

ii. During excavation, native streambed materials will be stockpiled above the bankfull elevation for later use. Once riprap has been placed, native materials will be placed over the top of the riprap.

iii. Material removed during excavation will only be placed in locations where it cannot enter streams or other water bodies.

iv. All exposed or disturbed areas will be stabilized to prevent erosion.

(1) Areas of bare soil within 150 feet of waterways, wetlands or other sensitive areas will be stabilized by native seeding,[23] mulching, and placement of erosion control blankets and mats, if applicable, quickly as reasonable after exposure, but within 7 days of exposure.

(2) All other areas will be stabilized quickly as reasonable, but within 14 days of exposure.

(3) Seeding outside of the growing season will not be considered adequate nor permanent stabilization.

v. All erosion control devices will be inspected during construction to ensure that they are working adequately.

(1) Erosion control devices will be inspected daily during the rainy season, weekly during the dry season, monthly on inactive sites.

(2) If inspection shows that the erosion controls are ineffective, work crews will be mobilized immediately, during working and off-hours, to make repairs, install replacements, or install additional controls as necessary.

(3) Erosion control measures will be judged ineffective when turbidity plumes are evident in waters occupied by listed salmonids during any part of the year.

vi. If soil erosion and sediment resulting from construction activities is not effectively controlled, the engineer will limit the amount of disturbed area to that which can be adequately controlled.

vii. Sediment will be removed from sediment controls once it has reached 1/3 of the exposed height of the control. Whenever straw bales are used, they will be staked and dug into the ground 5 inches (12 cm). Catch basins will be maintained so that no more than 6 inches (15 cm) of sediment depth accumulates within traps or sumps.

viii. Sediment-laden water created by construction activity will be filtered before it leaves the right-of-way or enters a stream or other water body. Silt fences or other detention methods will be installed as close as reasonable to culvert outlets to reduce the amount of sediment entering aquatic systems.

f. Site restoration. Site restoration and clean-up, including protection of bare earth by seeding, planting, mulching and fertilizing, is done in the following manner.

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[23] By Executive Order 13112 (February 3, 1999), Federal agencies are not authorized to permit, fund or carry out actions that are likely to cause, or promote, the introduction or spread of invasive species. Therefore, only native vegetation that is indigenous to the project vicinity, or the region of the state where the project is located, shall be used.

i. All damaged areas will be restored to pre-work conditions including restoration of original streambank lines, and contours.

ii. All exposed soil surfaces, including construction access roads and associated staging areas, will be stabilized at finished grade with mulch, native herbaceous seeding, and native woody vegetation prior to October 1. On cut slopes steeper than 1:2, a tackified seed mulch will be used so that the seed does not wash away before germination and rooting occurs. In steep locations, a hydro-mulch will be applied at 1.5 times the normal rate.

iii. Disturbed areas will be planted with native vegetation specific to the project vicinity or the region of the state where the project is located, and will comprise a diverse assemblage of woody and herbaceous species.

iv. Plantings will be arranged randomly within the revegetation area.

v. All plantings will be completed prior to April 15.

vi. No herbicide application will occur within 300 feet of any stream channel as part of this permitted action. Mechanical removal of undesired vegetation and root nodes is permitted.

vii. No surface application of fertilizer will be used within 50 feet of any stream channel as part of this permitted action.

viii. Fencing will be installed as necessary to prevent access to revegetated sites by livestock or unauthorized persons.

ix. Plantings will achieve an 80 percent survival success after three years.

(1) If success standard has not been achieved after 3 years, the applicant will submit an alternative plan to the COE. The alternative plan will address temporal loss of function.

(2) Plant establishment monitoring will continue and plans will be submitted to the COE until site restoration success has been achieved.

g. Compensatory mitigation. Authorizations of projects that result in permanent, new impermeable surfaces, hard structures, or other conditions that prevent the reestablishment of natural riparian vegetation or otherwise preclude natural hydrologic and erosion processes must include compensatory mitigation as follows:

i. Design. In determining the nature and extent of mitigation required, the COE will consider the functional values lost and the likelihood of success.

(1) The COE will give preference to types of mitigation most likely to achieve a level of ecological function that is equal to or greater than was lost due to completion of the project.

(2) If on-site mitigation is not feasible due to space limitations at the project site, off-site mitigation will be undertaken close to the action area, within the same 5th order HUC, or otherwise as near to the action area as possible. The COE will not accept operational convenience or cost as acceptable justifications for choosing to mitigate off-site.

(3) Mitigation will be measured in actual acreage and, to the extent possible, ecosystem function.

ii. Erosion control. All mitigation activities involving placement of material along or adjacent to streambanks for the purpose of preventing bank erosion must also meet all terms and conditions for Reasonable and Prudent Measure #1 (erosion control).

iii. Construction. All mitigation activities involving temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage, must also meet all other applicable terms and conditions to implement this Reasonable and Prudent Measure (#16, construction).

h. Monitoring: Construction. Within 30 days of completing the project, the applicant will submit a monitoring report to the COE describing the applicant's success meeting their permit conditions. This report will consist of the following information.

i. Project identification.

(1) Permit number;
(2) applicant's name;
(3) project name;
(4) category of activity under which the permit was issued;
(5) project location by 5th field hydrological unit code (HUC) and latilong;
(6) compensatory mitigation site(s) (if any) by 5th field HUC and latilong;
(7) starting and ending dates for work performed under the permit; and
(8) the COE contact person.

ii. Isolation of in-water work area. All projects involving isolation of in-water work areas must include a report of any seine and release activity including:

(1) The name and address of the supervisory fish biologist;
(2) methods used to isolate the work area and minimize disturbances to ESA-listed species;
(3) stream conditions prior to and following placement and removal of barriers;
(4) the means of fish removal;
(5) the number of fish removed by species;
(6) the location and condition of all fish released; and
(7) any incidence of observed injury or mortality.

iii. Pollution and erosion control. Copies of all pollution and erosion control inspection reports, including descriptions of any failures experienced with erosion control measures, efforts made to correct them and a description of any accidental spills of hazardous materials.

iv. Treated wood pilings. Any project involving removal of treated wood pilings must include the name and address of the approved disposal area and the plan for long-term monitoring to ensure that if altered currents expose more pile, it will also be removed.

v. Site restoration. Documentation of the following conditions:

(1) Finished grade slopes and elevations.
(2) Log and rock structure elevations, orientation, and anchoring, if any.

(3) Planting composition and density.

(4) A plan to inspect and, if necessary, replace failed plantings and structures for a period of five years.

vi. A narrative assessment of the project's effects on natural stream function.

vii. Photographic documentation of environmental conditions at the project site and compensatory mitigation site(s) (if any) before, during and after project completion.

(1) Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.

(2) Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.

(3) Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

17. To implement Reasonable and Prudent Measure #17 (standard local operating procedures for endangered species)(SLOPES) above, the COE shall ensure that:

a. Protective coverage of this incidental take statement is only applied to proposed actions within the categories of activities considered by this Opinion and limited by these terms and conditions.

b. If the COE does not have sufficient data to determine whether a project is within the present or historic range of a listed species or designated critical habitat, it will contact either the NMFS or the appropriate District Fish Biologist of ODFW to confirm the status of the project area.

c. Landowners will agree to allow reasonable access[24] to sites for long-term monitoring of the effectiveness of these reasonable and prudent measures, terms and conditions, for avoiding and minimizing take. This access is not intended for enforcement purposes. If potential violations are discovered, the appropriate agency will work cooperatively with the landowner to achieve compliance.

d. All permits issued will contain the following notice.

> NOTICE. If a dead, injured, or sick endangered or threatened species specimen is located, initial notification must be made to the National Marine Fishery Service Law Enforcement Office, located at Vancouver Field Office, 600 Maritime, Suite 130,

[24] "Reasonable access" means with prior notice to the permittee, the COE and NMFS may at reasonable times and in a safe manner enter and inspect authorized projects to insure compliance with the reasonable and prudent measures, terms and conditions, in this biological opinion.

Vancouver, Washington 98661; phone: 360/418-4246. Care should be taken in handling sick or injured specimens to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death.

In conjunction with the care of sick or injured endangered and threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

e. Annual monitoring report. By January 31 of each year, the COE will provide the NMFS with an annual monitoring report that describes the COE's achievements carrying out this Opinion through the permitting program for the fifteen categories of activities. This report will summarize project identification data, with special attention to projects featuring erosion control, stream crossings, and dredging, and provide an assessment of program activities.

i. Project level data for all permits issued under this Opinion will be summarized in an electronic spread sheet containing the following information:
   (1) Permit number;
   (2) applicant's name;
   (3) project name;
   (4) category of activity under which the permit was issued;
   (5) location by 5th field hydrological unit code (HUC), river mile and latilong;
   (6) starting and ending dates for work performed under the permit; and
   (7) the COE contact person.

ii. The NMFS is particularly interested in an accounting of projects that required a supporting analysis, i.e., erosion control, utility stream crossings, road crossings, discharge and excavations, maintenance dredging, and fish and wildlife devices and activities. For those projects, provide a summary of supporting analyses by 5th field HUC in a separate part of the monitoring report.

iii. In addition to project level data, the monitoring report will include an overall assessment of all COE permitting activities by categories of action considered in this Opinion during the previous year, including an evaluation of:
   (1) The level of program participation;
   (2) the quality of supporting analyses required for individual actions involving erosion control, stream crossings, dredging, and fish and wildlife activities;
   (3) the quality of monitoring information provided by permittees;

(4) the quantity and quality of compensatory mitigation completed by permittees;

(5) trends in the environmental baseline by 5th HUC as a result of activities permitted under this Opinion; and

(6) recommendations to improve the effectiveness of the program.

iv. The annual report will be submitted to:

Branch Chief - Portland
National Marine Fisheries Service
Attn: OSB2001-0016
525 NE Oregon Street
Portland, OR 97232

f. The COE will meet with NMFS by March 31 each year to discuss the monitoring report and any actions that may be necessary to make the program more effective.

g. The COE will reinitiate formal consultation on the categories of actions authorized by this Opinion within three years of the date of issuance. This term and condition is in addition to reinitiation requirements described in section VII, above.

3. ESSENTIAL FISH HABITAT

"Essential fish habitat" (EFH) provisions of the Magnuson-Stevens Act (MSA) require heightened consideration of a fish habitat in resource management decisions. EFH is defined in the section 3 of the MSA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The NMFS interprets EFH to include aquatic areas and their associated physical, chemical and biological properties used by fish that are necessary to support a sustainable fishery and the contribution of the managed species to a healthy ecosystem.

The MSA and its implementing regulations at 50 CFR 600.920 (j) require that before a Federal agency may authorize, fund or carry out any action that may adversely effect EFH, it must consult with NMFS and, if requested, the appropriate Regional Fishery Management Council. The purpose of consultation is to develop a conservation recommendation that addresses all reasonably foreseeable adverse effects to EFH. Further, the action agency must provide a detailed response in writing to NMFS and the appropriate Council within 30 days after receiving an EFH conservation recommendation. The response must include measures proposed by the agency to avoid, minimize, mitigate, or offset the impact of the activity on EFH. If the response is inconsistent with conservation recommendations of NMFS, the agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, or mitigate such effects.

This consultation requirement does not distinguish between actions which occur within EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and up slope activities that may have an adverse

effect on EFH. Therefore, EFH consultation with NMFS is required by Federal agencies undertaking, permitting or funding activities that may adversely affect EFH, whatever its location.

The objective of this consultation is to determine whether the proposed action, adoption of permit conditions for certain activities within the State of Oregon by COE that would preclude the need for further individual ESA consultation and the development of standard local operating procedures for these activities, is likely to adversely affect EFH. If the proposed action is likely to adversely affect EFH, a conservation recommendation will be provided.

3.1. Identification of Essential Fish Habitat

The Pacific Fishery Management Council (PFMC) is one of eight Regional Fishery Management Councils established under the Magnuson-Stevens Act. The PFMC develops and carries out fisheries management plans for Pacific coast groundfish, coastal pelagic species and salmon off the coasts of Washington, Oregon and California, and recommends Pacific halibut harvest regulations to the International Pacific Halibut Commission.

Pursuant to the MSA, the PFMC has designated freshwater and marine EFH for chinook and coho salmon (PFMC 1999), EFH for five species of coastal pelagic species (PFMC 1998a), and a "composite" EFH for 62 species of groundfish (PFMC 1998b). For purposes of this consultation, freshwater EFH for chinook and coho salmon in Oregon includes all streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to chinook or coho salmon, except upstream of the following impassable dams: Opal Springs, Big Cliff, Cougar, Dexter, Dorena, Soda Springs, Lost Creek, Applegate, Bull Run, Oak Grove, and the Hells Canyon Complex. In the future, should subsequent analyses determine the habitat above any of these dams is necessary for salmon conservation, the PFMC will modify the identification of Pacific salmon EFH (PFMC 1999). Marine EFH for chinook and coho salmon in Oregon includes all estuarine, nearshore and marine waters within the western boundary of the U.S. Exclusive Economic Zone (EEZ), 200 miles offshore. EFH for coastal pelagic species and composite EFH for groundfish in Oregon includes all waters, substrates and associated biological communities from the mean higher high water line, the upriver extent of saltwater intrusion in river mouths, and along the coast extending westward to the boundary of the EEZ.

3.2. Proposed Action

The proposed action area encompasses all rivers and streams within Oregon, as well as estuaries and waters offshore of Oregon. The estuarine and offshore marine waters are designated EFH for various life stages of 62 species of groundfish and 5 coastal pelagic species. A detailed description and identification of EFH for groundfish is found in the Final Environmental Assessment/Regulatory Impact Review for Amendment 11 to The Pacific Coast Groundfish Management Plan (PFMC 1998a) and the NMFS EFH for West Coast Groundfish Appendix (Casillas *et al*. 1998). A detailed description and identification of EFH for coastal pelagic species is found in Amendment 8 to the Coastal Pelagic Species Fishery Management Plan (PFMC 1998b). The proposed action area also encompasses the Council-designated EFH for chinook (*Onchorhynchus tshawytscha*) and for coho (*Onchorhynchus*

kisutch) salmon. A description and identification of EFH for salmon is found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of the impacts to these species' EFH from the above proposed COE action is based on this information.

The objective of this programmatic EFH consultation is to determine whether the adoption of proposed conditions for 15 categories of activities permitted by COE throughout the State of Oregon and allowing issuance of permits for those activities without further EFH consultation may adversely affect EFH for the species listed in Table 2. Another objective of this programmatic EFH consultation is to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse impacts to EFH resulting from the proposed 15 categories of activities identified in Part II above.

3.3. Effects of the Proposed Action

Information submitted by the COE is sufficient to conclude that the effects of this action on EFH are likely to be within the range of effects considered in the ESA portion of this consultation.

3.4. Conclusion

Using the best scientific information available, NMFS has determined that adoption of permit conditions for certain activities within the State of Oregon by COE that would preclude the need for further individual ESA consultation and the development of standard local operating procedures for these activities, is likely to adversely affect EFH for coho salmon, chinook salmon, coastal pelagic species, or groundfish listed in Table 2.

3.5. EFH Conservation Recommendation

The Reasonable and Prudent Measures and the Terms and Conditions outlined above in Part VIII are applicable to designated groundfish, coastal pelagics and salmon EFH. Therefore, NMFS recommends that the Reasonable and Prudent Measures and the Terms and Conditions which implement them that are listed above be adopted. Should these EFH conservation recommendations be adopted, potential adverse impacts to EFH would be minimized.

A Federal action agency must provide a detailed, written response to NMFS within 30 days after receiving to EFH conservation recommendation. 50 CFR section 600.920(j). The response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset the impact of the activity on EFH. If the response is inconsistent with a conservation recommendation from NMFS, the agency must explain its reasons for not following the recommendation.

3.6. Consultation Renewal

The COE must reinitiate EFH consultation with NMFS if plans for this action are substantially revises in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations. 50 CFR Section 600.920(k).

Table 2. Species with designated EFH found in waters of the State of Oregon.[25]

Ground Fish Species	Blue rockfish (*S. mystinus*)	Rougheye rockfish (*S. aleutianus*)	Flathead sole (*Hippoglossoides elassodon*)
Leopard shark (*Triakis semifasciata*)	Bocaccio (*S. paucispinis*)	Sharpchin rockfish (*S. zacentrus*)	Pacific sanddab (*Citharichthys sordidus*)
Soupfin shark (*Galeorhinus zyopterus*)	Brown rockfish (*S. auriculatus*)	Shortbelly rockfish (*S. jordani*)	Petrale sole (*Eopsetta jordani*)
Spiny dogfish (*Squalus acanthias*)	Canary rockfish (*S. pinniger*)	Shortraker rockfish (*S. borealis*)	Rex sole (*Glyptocephalus zachirus*)
Big skate (*Raja binoculata*)	Chilipepper (*S. goodei*)	Silvergray rockfish (*S. brevispinus*)	Rock sole (*Lepidopsetta bilineata*)
California skate (*R. inornata*)	China rockfish (*S. nebulosus*)	Speckled rockfish (*S. ovalis*)	Sand sole (*Psettichthys melanostictus*)
Longnose skate (*R. rhina*)	Copper rockfish (*S. caurinus*)	Splitnose rockfish (*S. diploproa*)	Starry flounder (*Platyichthys stellatus*)
Ratfish (*Hydrolagus colliei*)	Darkblotched rockfish (*S. crameri*)	Stripetail rockfish (*S. saxicola*)	
Pacific rattail (*Coryphaenoides acrolepsis*)	Grass rockfish (*S. rastrelliger*)	Tiger rockfish (*S. nigrocinctus*)	**Coastal Pelagic Species**
Lingcod (*Ophiodon elongatus*)	Greenspotted rockfish (*S. chlorostictus*)	Vermillion rockfish (*S. miniatus*)	Northern anchovy (*Engraulis mordax*)
Cabezon (*Scorpaenichthys marmoratus*)	Greenstriped rockfish (*S. elongatus*)	Widow Rockfish (*S. entomelas*)	Pacific sardine (*Sardinops sagax*)
Kelp greenling (*Hexagrammos decagrammus*)	Longspine thornyhead (*Sebastolobus altivelis*)	Yelloweye rockfish (*S. ruberrimus*)	Pacific mackerel (*Scomber japonicus*)
Pacific cod (*Gadus macrocephalus*)	Shortspine thornyhead (*Sebastolobus alascanus*)	Yellowmouth rockfish (*S. reedi*)	Jack mackerel (*Trachurus symmetricus*)
Pacific whiting (Hake) (*Merluccius productus*)	Pacific Ocean perch (*S. alutus*)	Yellowtail rockfish (*S. flavidus*)	Market squid (*Loligo opalescens*)
Sablefish (*Anoplopoma fimbria*)	Quillback rockfish (*S. maliger*)	Arrowtooth flounder (*Atheresthes stomias*)	
Aurora rockfish (*Sebastes aurora*)	Redbanded rockfish (*S. babcocki*)	Butter sole (*Isopsetta isolepsis*)	**Salmon**
Bank Rockfish (*S. rufus*)	Redstripe rockfish (*S. proriger*)	Curlfin sole (*Pleuronichthys decurrens*)	Coho salmon (*O. kisutch*)
Black rockfish (*S. melanops*)	Rosethorn rockfish (*S . helvomaculatus*)	Dover sole (*Microstomus pacificus*)	Chinook salmon (*O. tshawytscha*)
Blackgill rockfish (*S. melanostomus*)	Rosy rockfish (*S. rosaceus*)	English sole (*Parophrys vetulus*)	

[25] From Casillas *et al* 1998, Eschmeyer *et al*. 1983, Miller and Lea 1972, Monaco *et al*. 1990, Emmett *et al*. 1991, Turner and Sexsmith 1967, Roedel 1953, Phillips 1957, Roedel 1948, Phillips 1964, Fields 1965, Walford 1931, Gotshall 1977, Hart 1973, Healey 1991, Sandercock 1991, Bottom *et al*. 1984, Schultz 1953, and Dees 1961.

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